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The arithmetic curriculum begins with grouping and manipulation of objects, constructing and measuring things, and dramatizing number situations. The child should not be allowed to remain in the manipulative stage but should become proficient in using numbers abstractly. The subject matter in the first grade includes counting, working with ordinals through six, money concepts, measurement and reading numbers to 100. The curriculum continues in these areas for second grade students including one step problems, concept of zero and addition and subtraction through 13. Fractions, multiplication and division are introduced in the third grade with addition and subtraction of 2 and 3 place numbers, and roman numerals. Fourth grade students multiply through 9, divide even and uneven problems, use simple fractions and begin two step problems. Division and multiplication use four digits in the fifth grade, and fractions and roman numeral work becomes increasingly harder. By the sixth grade, students should be competent in multiplication, division, common fraction, decimals, measurement and simple graphs. Kindergarten children study how to keep well and sense things that go. Grades one and two study seasons and safety. Minerals, living things, food and clothing and machines are in the third grade curriculum. Fourth and fifth grade students look at living things, weather and water. Sixth graders look at the universe, electricity and magnetism and health functions. Health and science units list concepts, activities and materials that can be used for each unit.							
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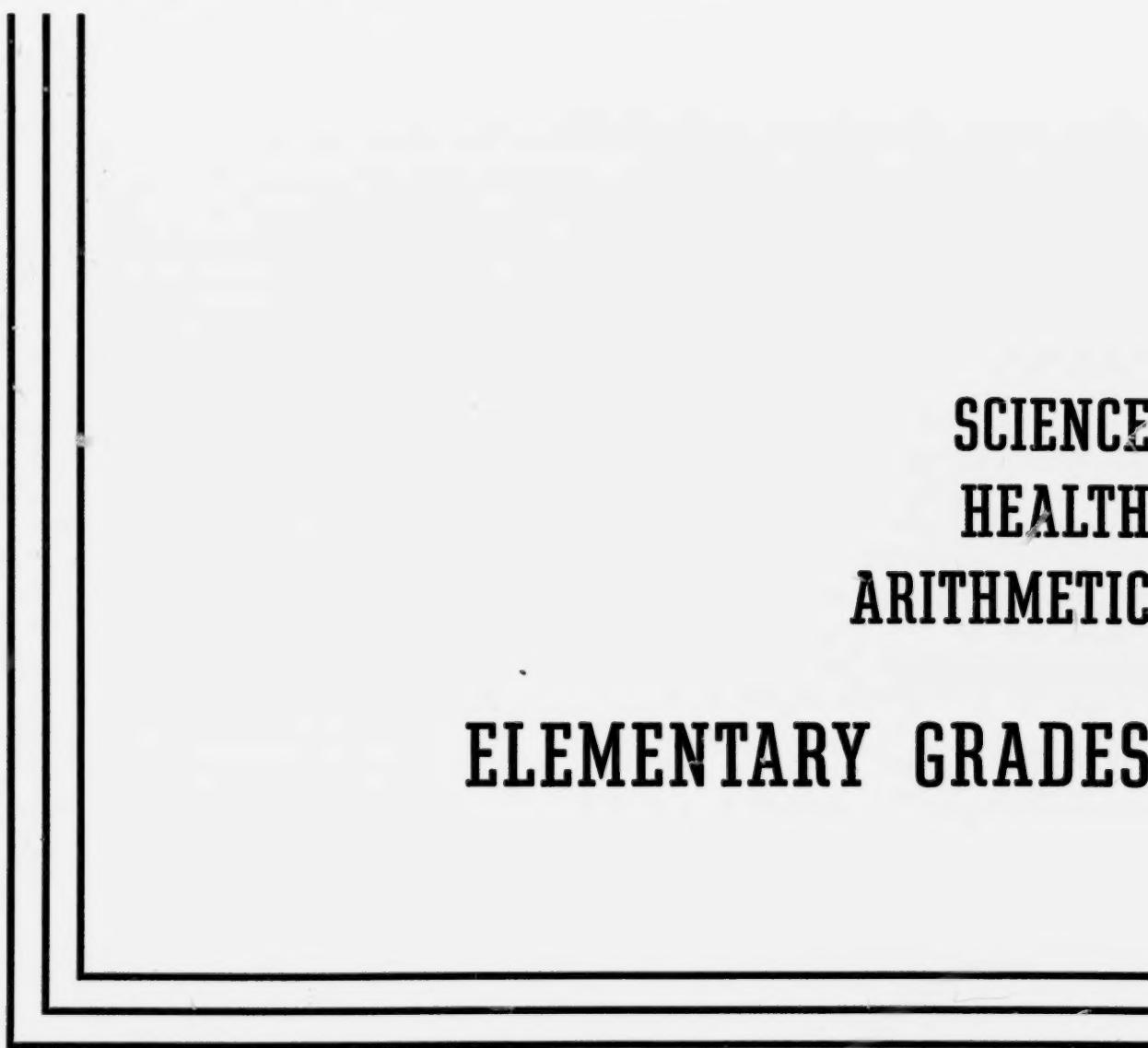
CURRICULUM HANDBOOK

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CURRICULUM HANDBOOK



**SCIENCE
HEALTH
ARITHMETIC**

ELEMENTARY GRADES

**AKRON PUBLIC SCHOOLS
MARTIN ESSEX, SUPERINTENDENT**

**AKRON, OHIO, 1958
PUBLICATION NO. 122**

INTRODUCTORY STATEMENT

The arithmetic section in these outlines is intentionally brief. Teachers are urged to make intelligent use of the excellent teaching suggestions found in the "Teachers Edition" of the adopted arithmetic series. A copy of this edition is provided for every teacher of arithmetic.

The science section includes units that have been worked out in considerable detail. These units represent the thinking of many of our best teachers so should prove very useful.

Because no basic textbooks are provided for teaching health in the elementary grades, teachers are urged to give full attention to the units in the science series which deal with health. In addition, teachers are expected to give as much time as necessary to health inspection, checking of health habits and other practical health activities. Many good supplementary materials for the teaching of health are available. Some of the best of these are provided by the Akron Dairy Council, located at 221 West Exchange Street. The Director of the Akron Dairy Council is available to schools as a consultant on problems dealing with foods, nutrition and other related health problems.

These outlines are not intended to discourage individual initiative and creativeness on the part of teachers. The guide is to be used rather than followed. While it is expected that the assigned area of content will be the basis for study in each grade, every teacher has the responsibility for adjusting content, materials of instruction and methodology to meet the needs of her own group of children.

Our grateful appreciation is extended to all those persons whose efforts have made this publication possible. Special appreciation is expressed to Mrs. Mary Louise Beverly, Director of Elementary Education, who gave competent leadership in this undertaking. The names of the members of the various units follow:

Arithmetic Committee

Martha Rylander - Chairman
Helen Mikolashek - First Grade
Jean Pheasant - Second Grade
Jane Cummins - Third Grade
Gertrude Hardmon - Fourth Grade
Chester Firchow - Fifth Grade
Virginia Gillooly - Sixth Grade

Science Committees

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Dorothy Davidson
Alma Griffiths
Kay McCarthy
Margaret McDonald
Anna Williams

Fourth Grade

Hugh Mabe - Chairman
Rae Marie Fabre
Elizabeth Hall

Jean Hixson

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Fifth Grade

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James Crouse

James Grand

Norris Mooney

Angelina Parr

Shirley Segraves

Wanda Thomas

A. J. DILLEHAY

Assistant Superintendent
Curriculum and Instruction

AJD/FHB

TIME ALLOTMENT FOR PRIMARY GRADES

The following time allotment for the primary grades is set up to guide teachers in planning daily programs. It is not intended that a rigid time schedule be followed, but it is desirable that each subject area should receive its allotted time during a given semester.

<u>Subject</u>	<u>Grade I</u>	<u>Grade II</u>	<u>Grade III</u>
Planning Time	150	150	150
Language Arts - Reading, Literature, Oral and Written Expression	725	725	650
Social Studies	100	150	200
Number Work	50	100	125
Science and Health	100	100	150
Art	100	100	100
Music	100	100	100
Rest, Indoor and Outdoor Play, Free Activities	200	150	100
Evaluation	50	50	50

During the early morning period the teacher should take time to look at each child carefully for signs of illness. This can be done quite casually and unobtrusively.

In the first grade, definite periods for number work should be scheduled. Teachers will also be alert for opportunities to develop number concepts during the entire daily program.

A considerable part of the time allotment for music and art should be included in other activities, such as the opening period, language arts or social studies.

A self-contained classroom organization is recommended for the primary grades.

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ARITHMETIC

It is essential that the elementary teachers have various materials so that they may give children many experiences in "grouping and manipulating objects, constructing and measuring things, and dramatizing number situations." Winston, Ready for Numbers, Page One.

Children should not be allowed, however, to remain in the manipulative stage of learning. After they have worked with concrete objects, they need to become proficient in using numbers abstractly, although they should be allowed to return to the concrete if it is necessary to maintain or develop further understanding.

Most children are introduced to simple concepts of number in the home. Broader concepts are developed in kindergarten and on through the school experience. One of the most important aims on the part of the teacher should be to develop in each pupil a sense of responsibility for learning the number combinations in the four fundamental operations. Answers to number facts should be given automatically. This comes through much oral work and purposeful practice. Build understanding and then have children study their number facts.

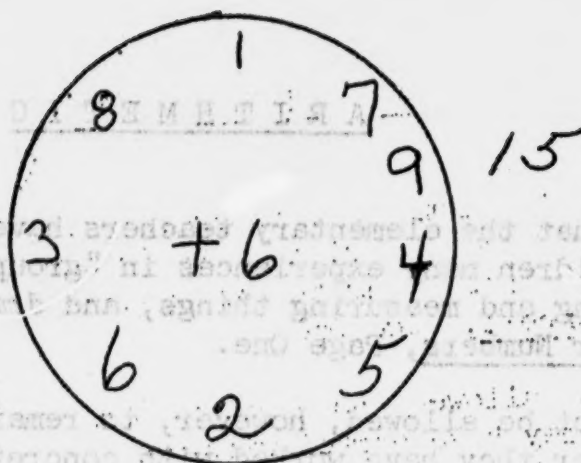
If individual differences are to be met, grouping in arithmetic classes is just as important as grouping in reading. A recommended method of grouping consists of teaching the class as a whole when a new process is developed, then dividing into groups according to need. For instance, the teacher may present a lesson in subtraction of simple fractions to the whole class. The next day he sends children to the chalk board and discovers those who thoroughly understand the work. He sets them to working examples on paper while he again presents the lesson to the rest of the group. The next day he discovers (perhaps through sending pupils to the board again) those who still do not understand. He may work with them individually or in a small group.

Procedures Liked by Some Teachers

Use the team approach to checking. Arithmetic pupil study cards are available from the warehouse, Number 500, 501, 502, 503, and enough should be ordered for at least half the class. Have two children check each other and study the number facts they do not know.

Have each child make his own number circle booklet and put in red the number facts which he does not know. Do this with the four fundamental processes as the need arises. This is excellent homework material. These circles can be put on large charts for class drill.

(Arithmetic)



Teachers need to check and recheck to see that the child who misses an example, studies the number fact he does not know.

It is recommended that teachers have children make the number kits described by Winston. Directions for making these are given in the teachers' edition of the textbook.

Objectives

- To make arithmetic meaningful to children
- To encourage children to experiment and explore with numbers
- To help children discover and to see relationships
- To develop mathematical skills according to the pupil's level of achievement
- To make arithmetic functional so that children understand the meaning of measures and measurements, are able to use and interpret graphs and tables, and habitually make application of their arithmetic learnings.
- To stress social applications and to provide opportunities for problem solving.

Understandings

- Sequence and orderliness are characteristic of number.
- Our number system is based on a system of ten-ness.
- Example - Two place numbers are made up of ones and tens.
Three place numbers are made up of ones, tens and hundreds.
- Our money system is related to our number system.
- Fraction means part.
- Measurement is functional to all people.
- Arithmetic is qualitative as well as quantitative.

Adopted Arithmetic Textbooks

Brueckner-Merton-Grossnickle	Ready for Numbers, 1 teacher edition	JCW
	Using Numbers, 2	JCW
	New Discovering Numbers, 3	JCW
	New Learning Numbers, 4	JCW
	New Exploring Numbers, 5	JCW
	New Understanding Numbers, 6	JCW

SUBJECT-MATTER OUTLINE OF ARITHMETICFIRST GRADE: Counting by rote-numbers by 1's - 5's - 10's to 100

Reading numbers to 100 or as far as the primer requires

Sequence-number before, number after, number between

Writing of numbers 1 to 9

Writing and reading words through 10

Ordinals first through sixth

Meaning - emphasis on ten-ness

Building concepts of addition and subtraction facts through six. (More advanced group through ten)

Meaning of $\div$ - :: as: and, take away, areFraction - $\frac{1}{2}$, concept of equal parts

Money concepts - penny, nickel, dime, quarter. Selection of coins to make 50¢ or less.

Measures - Clock - even hour

Liquid - pint, quart

Terms - line, circle, square, cross (triangle)

Linear - inch, foot, use of ruler

Throughout the year, the following concepts could be introduced by games, rhymes, songs, dramatizations and the use of concrete objects:

above - below

before - between - after

big - little

empty - full

fast - slow

front - back

half - whole

high - low

in - out

large - small

long - short

more - less

narrow - wide

near - far

old - young

tall - short

thick - thin

top - bottom

under - over - on

up - down

Comparisons:

fast, faster, fastest

slow, slower, slowest, et cetera

first, last

Forms:

line

circle

square

triangle

(Arithmetic)

Quantitative Terms:

day	more	less	inch
month	as many	quart	foot
pair	fewer	gallon	enough

SECOND GRADE: Reading and writing three digit numbers

Number - Counting to 200 and on farther for the advanced pupil

Concept of zero - as a place holder

as a remainder when all have been taken

as meaning "none" or "no score"

starting place on scales and thermometer

Counting by 2's to 100

Meaning of odd and even

Ordinals through 10th

Addition and subtraction-facts taught through 13, but developed through 18

Introduction of doubles

1	2	3	4	5	6	7	8	9
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>

Practice until answers are automatic

One-step problems

Teaching of symbols by names /plus = equals - take away, both horizontal and vertical forms

Fractions: Visualizations of $\frac{1}{2}$ and $\frac{1}{4}$, drill on concept of $\frac{1}{2}$

Money - cent, nickel, dime, quarter, half dollar, dollar.

Selection of coins to make \$1.00

Measures - Clock - hour and half hour

Calendar - days of week

Gallon - quart, pint, cup

Dozen - half dozen

Thermometer - zero, freezing

Scales - pounds

Ruler - inch, foot, yard

vocabulary

calendar
check
circle
coins

cup
days
degree
dozen

enough
equal
even
few

foot
freezing
gallon
half

half dozen
half gallon
half pint
inch

(Arithmetic)

(Arithmetic)

large	more than	pint	short	thermometer
less	most	pound	small	whole
long	oblong	quart	square	yard
months	ordinals	rectangle	tall	zero
more	oval	round	temperature	What do we need?
				What are we try-
				ing to find?
				$\frac{1}{2}$ $\frac{1}{4}$
				$\frac{1}{2}$ $\frac{1}{4}$
				$\frac{1}{2}$ $\frac{1}{4}$

Vocabulary

change
checking
column
company
degree
difference between
equals
how much more

(Arithmetic)

THIRD GRADE: Reading and writing four digit numbers. Emphasis on place values.

Zero as a place holder

Roman numerals through XX. Signs $\equiv$, $-$, $\times$, $+$

100 addition facts - mastered

100 subtraction facts - mastered

Adding by endings and by carrying in one's place and ten's place

Column addition

Addition and subtraction of 2 and 3 place numbers

Subtraction by regrouping

Checking habitually

One step problems

Multiplication - 2 and 3 combinations, 4 and 5 optional
Reversals in multiplication. Carrying in multiplication.

Division-related facts

Fractions - introduction of $\frac{1}{3}$, $\frac{1}{4}$ and other small fractions

Measurements: $\frac{1}{2}$ inch - foot - yard
pint, quart, gallon, $\frac{1}{2}$ gallon, $\frac{1}{2}$ pint
pound, half pound
quarter hour and minutes on clock face
dozen and half dozen
thermometer *calibrated in*

Reading and writing dollars and cents

Vocabulary

charge
checking
column
company
degree
difference between
equals
how much more

how much less
inch
larger
liquid
minus
ounce
plus
product

quotient
remainder
score
smaller
sum
thousand
weight

(Arithmetic)

FOURTH GRADE: Reading and writing of five and six-digit numbers

Roman numerals to 50

Review work of previous grades for addition and subtraction,
with some addition and subtraction of four-digit numbers.

Multiplication combinations 4 through 9

Multiplication and related division facts

Multiplication of dollars and cents by a number

Optional two-digit multipliers

Division both even and uneven, with 0 in tens' and hundreds'
place

Checking in division

Estimating answers - finding averages

Fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{3}$, $\frac{1}{5}$, $\frac{1}{10}$

Meanings of fractions

Introduction of 2-step problems - stressing labeling in
written-thought problems

Picture problems

Measurements: mile, peck, bushels, perimeter

Vocabulary

addition	multiplicand	Roman Numerals
Arabic numerals	multiplication	square
circle	multiplier	subtract
common fraction	ounce	subtraction
decimal point	perimeter	sum
difference	place value	tens
digits	plus	thousands
division	pound	ton
divisor	product	triangle
estimating	quotient	unit
fraction	rectangle	whole numbers
hundreds	remainder	
minus	rod	

(Arithmetic)

FIFTH GRADE: Reading and writing seven-digit numbers

Roman numerals through C

Reading and writing common fractions

Addition and subtraction with 3 and 4-digit numbers

Tables through 12

Multiplication - 3 and 4-digit multiplicands and 2-figure multipliers

Division - even, uneven, fractional remainder when possible

Division with 4-digit dividends, 2-digit divisors, zeros in quotient

Two-step thought problems - estimating answers, labeling

Common fractions - terms numerator
denominator

Kinds of fractions

Addition and subtraction of like fractions

Addition and subtraction of simple unlike fractions

Reduction of fractions through visual aids

Finding averages

Multiplication and division of U. S. money by a number

Introduction of decimals to tenths and hundredths, using relationship to common fractions

Measurements - perimeter area, graphs, drawing to scale, square measure

Addition and subtraction of decimals to hundreths

Vocabulary

Numbers

approximate
average
estimate
million
place value
total

Division

divisor
dividend
quotient

Multiplication

multiplier
multiplicand
partial product
product
zero as a place

(Arithmetic)

SIXTH GRADE:

Decimals

decimal fraction
hundredth
mixed decimal
tenth

area
dimensions
graph
perimeter
rectangle
scale
square measure
unit of measure

(Arithmetic)

SIXTH GRADE: Reading and writing numbers through millions

Roman numerals C. D. M. Write through the year 1957.

Review all previous work in the processes

Multiplication by 10, 100, 1000

Multiplier of 3 and 4 figures, using zero in different places

Division - estimating quotients
dividends of five or six digits
emphasis on even division
zero in different places both in dividend and quotient

Fractions - teaching common and decimal fractions in relationships using fraction kit with decimal board
completing work involving fractions and decimals (multiplication and division) with emphasis on meaning

Measurement: perimeter, area, square, rectangle, parallelogram, triangle

Graphs - scale drawing

Picture graphs

Addition, subtraction, multiplication and division of denominate numbers

Two-step problems - stressing approximating finding averages

Rounding off whole numbers and decimals

Vocabulary

account
addends
acre
approximate
area
average
avoirdupois

billion	C. O. D.
budget	cube
cancel	decimal
capacity	denominator
carat	diagonal
circle	difference
common denominator	digit

(Arithmetic)

Vocabulary (continued)

dimensions	numerator	section
dividend	operation	square
division	ounce	standard time
divisor	parallelogram	statement
drawn to scale	perimeter	sum
equivalent	place value	surface
estimate	price	tabulation
expense	product	tens' place
fluid ounce	quantity	terms
fraction	quotient	thousandths
graph	receipt	triangle
hundredths	rectangle	uneven
incomplete decimals	reduce	unit
invert	remainder	value
invest	rounded off	vertex
million	scale drawing	whole

SCIENCE AND HEALTH IN KINDERGARTEN THROUGH SIXTH GRADE

Every child has a natural interest in the world around him. He learns with his whole being by touching, tasting, listening, watching, smelling, imagining. Dr. Craig says, "In a very real sense we might say that the potentialities of science are inside human beings."

It is expected that every teacher will train himself to be alert to learning situations within and without the classroom environment. For instance, children should discover the cause of condensation and evaporation when they see water dripping from the outside of pipes in the basement or condensing on the outside of the class terrarium. They should be introduced to moths when the cecropia leaves her cocoon and crawls up the twig to carefully fan her wings into their perfect state. Children are full of wonder, and advantage should be taken of every opportunity to challenge and excite that wonder.

There is a necessity for a carefully planned program on every developmental level as well as for incidental teaching.

In this atomic age the need for greater scientific knowledge will continue. Learning scientific laws at an earlier age will prepare children for more advanced study in the secondary schools. An understanding of this need should be a constant challenge to every teacher to read as widely as possible in the field of science. Major objectives in elementary science are as follows:

To guide children in an understanding and appreciation of the natural and physical world about them.

To develop in children the ability to think critically and scientifically, to be open minded, to avoid gullibility, to distinguish between fact and fiction.

To create an environment that will challenge children's intellectual curiosity.

To develop an awareness of the need for the conservation of our natural resources.

To help children become conscious of the beauty and wonder of the world about them.

To develop in children a feeling of responsibility to other people in order that they may be able to participate successfully in the world of today and tomorrow.

The teacher recognizes that each child has his own pattern of growth and that individuality expresses itself in a variety of ways at every age. He realizes the individual potentialities for good health in every child and endeavors to provide for him a balanced health program, emphasizing good human relationships

(Science)

and the necessity for putting into practice what is taught in health lessons. The health-education program has the following aims:

To make lessons in good nutrition practical

To encourage children to build physical fitness

To make practicing safety, habitual

To emphasize the value of sufficient rest and relaxation, along with work and exercise

To provide information for the prevention of disease

To provide for some form of health inspection each morning

To teach the dangers of narcotics and alcohol

To be used most effectively, science books in every classroom should be on at least three levels of difficulty.

Glenn Blough, who has done much to stimulate thinking in the science field, in an article on "Using Science Texts in the Classroom" in Teaching Trends, says of the "problem-solving point of view:" "Suppose the sixth grade has reached the point of working on some science problems related to the use of electric current.

"The first steps are taken, not in the book, but where people use electric current. Pupils have as a home assignment: 'Observe all of the places where you see electricity being used -- at home, in school, on the way to and from school, and elsewhere.' A list is compiled and there is discussion about the list centered on: 'How was the electricity being used and what was it actually doing?' As a result of these observations, problems such as the following are raised (only a few samples are given to illustrate the method):

1. Where does electricity come from?
2. How can a flashlight battery and a dry cell make electricity?
3. How do wires carry electricity?
4. Could we make and use some electricity here in our room?

"Pupils now go to their books, not to 'read the next five pages and tell the teacher what the pages say,' but to find answers to questions they are thinking about.

"During their reading, they discover a picture of a simple wet cell. This will help them at once with problem 4. 'Could we make one? Let's see what we need.' Pupils read to see what materials are needed. They, together with the teacher, find the materials. 'Now how shall we find out how to use them?'

(Science)

"In the book the children read the necessary directions. They perform an experiment, but alas (fortunately perhaps!) the wet cell doesn't work. 'Why not? Have we followed the directions carefully?' They reread and perform the experiment more carefully. It works. 'But how does the wet cell make the electricity?' Pupils give their ideas, 'How can we tell who is right?' They again go to the book to find the answer.

"Perhaps we have gone far enough to illustrate that the book is not being used as a reader. It is being used intelligently to find answers to questions, to learn how to do, to check on doing and thinking, and to gain some basic understandings (on the basis of what the children have done themselves). The process of getting into the book with a problem in mind and out of it when other ways of discovery will be helpful, continues as the pupils go on to solve more problems."

Our basic books, published by Heath, are rich in ideas for developing in children an alertness and wide-awake interest in finding out about the world they live in. In an article "Science Without Tears," Dr. and Mrs. Schneider offer some ways to keep science flowing along smoothly from day to day between science lessons. That seems to be where teachers are likely to miss some choice opportunities.

Their recommendations are:

1. Keep a science discovery chart - Science for Here and Now II
2. Make a science wonder box - Science Far and Near III
3. Make a mystery-of-the-week box. Seal it. Make up a riddle about the object within. Open the box on Friday.
4. Make teaser tags - Science in Our World V
5. Provide a science activity center instead of just a corner.
 - a. Use wisdom in accepting a number of objects for collections.
 - b. Have a small bowl for the buckeyes. When it is full, no more are to be brought.
 - c. Have a small space on the shelf or table for rocks. Have a committee judge them and accept only one of a kind.
 - d. Have a work space for experiments.
 - e. Have available for reference science books on the child's level.

In order to help the teacher, the Schneiders offer a check list on evaluation:

1. Did the material have positive value for the children?
(Did the subject-matter matter?)
2. Could the children state the problem?

(Science)

3. Did the children arrive at the conclusion themselves?
4. Was it an honest conclusion? In other words, was the experiment valid?
5. Did the lesson begin and end in the real world?
6. Where did we go?

Did we stay on the subject?

Did we list related problems for later solving?

7. How did we get there?

Was the lesson teacher dominated, or did the children participate?

"The exquisite geometry of a snowflake, the fascinating life cycle of a butterfly, the breath-taking concept of the solar system -- these are lovely and romantic things. Exclaim over them; encourage the children to speculate and wonder and rhapsodize." Schneider.

Adopted Science and Health Textbooks

HEATH	Science for Work and Play	First
	Science for Here and Now	Second
	Science Far and Near	Third
	Science in Your Life	Fourth
	Science in Our World	Fifth
	Science for Today and Tomorrow	Sixth
ALLEN and BACON	Exploring Science	One
	Exploring Science	Two
	Exploring Science	Three
	Exploring Science	Four
	Exploring Science	Five
	Exploring Science	Six
GINN	Science Near You	First
	Science Around You	Second
	Science Everywhere	Third
	Discovering With Science	Fourth
	Adventuring With Science	Fifth
	Experimenting in Science	Sixth

SCIENCE and HEALTH

KINDERGARTEN and

GRADES 1, 2, 3

Units will be of short duration
in the kindergarten and first
grade, and each may last only a
day or two.

SCIENCE SCOPE AND SEQUENCE CHART

KINDERGARTEN	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
We Keep Well Things That Go Safety (In Kindergarten Hand-book)	Calendar Weather Work-Play With Water Safety Water Traffic Toys Fire	Autumn Is Here Winter Is Here Spring Is Here	Rocks Minerals Clay - Salt Living Things in Lakes and Streams Food and Clothing Unit to be used with social studies units Simple Machines Health and Safety	Living Things Plants and Seeds Climate and Weather Water Power Health Nutrition Optional Units Bicycle Safety	Living Things Insects Weather Digestion Conservation in U. S. The study of soil, water and National Parks can be combined with a Social Studies Unit Optional Units Safety - Necessary qualifications for a patrol boy. How girls can help traffic safety Bicycle Safety	Universe Electricity and Magnetism (Use Fifth-Grade Health Book, P. 283-308) Health Functions of the Body System The Atmosphere and Outer Space Optional Units Communication Ways News Comes to Us Safety

ALTHOUGH SAFETY AND HEALTH UNITS ARE SOMETIMES LISTED AS OPTIONAL, A SAFETY CONSCIOUSNESS SHOULD BE DEVELOPED EVERY DAY, AND GOOD HEALTH HABITS SHOULD BE PRACTICED, ENCOURAGED AND CHECKED.

KINDERGARTEN

WE KEEP WELL

Concepts To Be Developed

1. The importance of proper food habits

Choose proper foods for breakfast, lunch, dinner.
Eat at least small amounts of different foods.
Learn the daily need for one egg, milk, fruit, and vegetables.
Learn the importance of eating leisurely meals.

2. The importance of play

Varied activities help develop strong bodies and muscular control.
Different kinds of play are liked by different members of the family.
Sunshine and fresh air help in promoting growth.

3. The importance of proper clothing

Clothing should be suited to weather and to the occasion.

4. The importance of rest and sleep

Learn the need for twelve hours sleep.
Sleep alone if possible.
Have quiet activities before bedtime.
Open the window if weather permits.

5. The importance of good health habits

Keep objects and hands away from face.
Keep lips away from drinking fountain.
Cover a cough or sneeze.

Approaches to Unit

Make use of children's references to their own families.
Lead group into discussions of a good breakfast, a good lunch, et cetera.
Tell or read stories about children at play.
Collect pictures and display them on bulletin board.
Show film strips - discuss.
Encourage children to bring in pictures of fruits and vegetables.

Problem 1

To develop in the children a desire to grow and be strong

(Kindergarten - We Keep Well)

(Problem 1 - continued)

Suggested Activities

Have good posture parades. Keep a large scrap book with pictures of healthful foods. Make good-meal charts. Plan and take a trip to dairy.

Problem 2

To build a desire to keep healthy

Suggested Activities

Dress dolls for winter weather, spring, summer, et cetera.

Discuss and dramatize the things we do to get ready for bed:

Hang up clothing

Wash

Brush teeth

Brush hair

Source Materials

Teaching Aids or Suggestions

Organizations:

Akron District Dairy Council (Health Posters)

General Mills, Inc. (Good Meal Charts)

Minneapolis, Minnesota

Cereal Institute, Inc. (Healthy Children At Play)

135 South LaSalle Street

Chicago 3, Illinois

Teachers's Texts:

Health, Through The Year - Frazier (Winger, 1947)

My First Health Book - Jones (Laidlaw Brothers, 1950)

Let's Read Together - Brown (Row, Peterson, 1949)

Everything - Anything - Aldis (G. Putnam)

Source Materials

Texts:

Spick and Span - Andress (Ginn and Company)

Health Parade - Dolch (Ginn and Company)

Time To Eat - Denther (Scott)

(Kindergarten - We Keep Well)

(Problem 2 - continued)

Building Good Health - Andress (Ginn and Company)

Sunshine and Rain - Frazier (Singer)

Healthy Home and Community - Goldberger (Ginn and Company)

Time For Sleep - Selsam (William Scott)

The First Book of Nurses - Mary Elting (Watts, Incorporated)

Happy Times - Buckley (Watts, Incorporated)

Audio-Visual Aids:

Husky and Skinny (animated cartoon), 194

Milk As You Like It (motion picture by Dairy Council of America), 366

Primary Health Series (film strips)-

Food for Health, FS803

Keeping Clean, FS793

Keeping Well, FS819

Rest and Sleep, FS801

Straight and Tall, FS809

Strong Teeth, FS802

(Kindergarten)

THINGS THAT GO

Concepts To Be Developed

Things that go are means of transportation for people, animals, mail, food, et cetera.

1. They take people where they want to go.
2. They take things where they need to go.

Things that go are helps in doing work.

Things that go may be toys or means of play.

Sometimes wheels make things move.

Sometimes the wind makes things move.

Sometimes animals make things move.

Approaches To Unit

Capitalize on children's interest in trips:

- How they traveled
- How father goes to work
- How mother goes shopping
- How we come to school, et cetera

Read stories about trains, boats, airplanes, cars, buses, et cetera.

Show pictures of things that move -- various means of transportation - or doing work, toys that move, engines, et cetera.

Show film strips and films on trains and other forms of land, air and water transportation.

Use mounted pictures and panoramas to arouse interest in things that go.

Plan a train ride. Visit a train station.

Allow children to bring to school for an exhibit their toys that move.

General Problems

1. How do things move?
2. How do things that go help us in our work?
3. How do things that go help us in our play?

(Kindergarten - Things That Go)

Suggestive Activities - Trains

Handicrafts:

Make box trains, using box, lid, milk-bottle caps, paper fastener, et cetera.

Build a large train for room, using barrel, tin cans, cereal box, bushel-basket tops, orange crates, et cetera.

Build a train, using blocks.

Assemble Playskool train.

Make purses for money to buy tickets for train ride.

For rhythms and songs, see Source Materials, page 23.

Suggestive Activities - Airplanes

Handicrafts:

Make paper airplanes.

Make airplanes, using clothespins, tongue depressors, cardboard, small nails.

Build airport and plane with blocks.

Build wooden airplanes at workbench.

For rhythms and songs, see Source Materials, pages 24 and 25.

Suggestive Activities - Boats

Handicrafts:

Make paper boats.

With blocks, build various kinds of boats.

Play Boat Lotto.

Build boats at workbench.

For rhythms and songs, see Source Materials, pages 25 and 26.

Suggestive Activities - More Things That Go

Hang a "mobile" in center of room. (This can be made of coat hangers).

Let children make various seasonal objects. Attach these to "mobile" and watch the movement.

(Kindergarten - Things That Go)

(Suggestive Activities - continued)

Make from paper: Pinwheels, windmills, kites

Build a roller-coaster with blocks.

For miscellaneous songs and rhythms, see Source Materials, pages 26, 27, 28.

SOURCE MATERIALS

BOOKS ABOUT TRAINS

SONGS

<u>Title</u>	<u>Author</u>	<u>Publisher</u>	<u>Date</u>
<u>The Kindergarten Book</u>	Pitts, Glenn, Watters	Ginn, New York	1949
I Am A Big Train	Page 131		
Train	Page 132		
All Aboard	Page 133		
<u>Sing and Play Book</u>	Ethel Crowinshield	Boston Music Co.	1938
The Train	Page 19		
Too! Too! Too!	Page 51		
<u>The Sunflower Song Book</u>	Jane Norton	John Day, New York	1935 1956
Clipper Train	Page 31		
<u>Singing Fun</u>	Wood and Scott	Webster Pub. Co.	1954
Little Engine	Page 43		

RHYTHMS (Some of the above songs may be used as rhythms.)

<u>Music In Playtime</u>	Bentley & Mathewson	Clayton S. Summy	1948
Choo-Choo Train	Page 17		
Streamliner	Page 17		
<u>The Kindergarten Book</u>	Pitts, Glenn, Watters	Ginn, New York	1949
Playing Train	Page 132		

STORIES

<u>The Little Train</u>	Lois Lenski	Oxford University	1940
<u>Two Little Trains</u>	Margaret Brown	Wm. R. Scott	1949

(Kindergarten - Things That Go)

(Source Materials - continued)

Choo Choo Virginia L. Burton Houghton-Mifflin 1937

Clear The Track For
Michael's Magic Train Louis Slobodkin

The Little Engine That
Could Watty Piper Platt & Munk

The Little Red Engine
Goes to Market Diana Denny

One Is The Engine Esther K. Meeks

Fast Trains! Busy
Trains Jane Barr Albert Whitman 1956

Here and Now Story Book Lucy S. Mitchell E. P. Dutton, N.Y. 1921
1942

How The Engine Learned The Knowing Song
Boris Takes A Walk and Finds Many Different Kinds of Trains
The Subway Car
A Locomotive

POEMS

Talking Time Scott & Thompson Webster Pub. Co.,
St. Louis 1951

Choo-Choo Train Conrad Wedberg

Sung Under The Silver
Umbrella Selected by ACE MacMillan Co., N.Y. 1935

Engine James S. Tippet
Trains James S. Tippet
The Elevated Train James S. Tippet

(There are finger plays about trains and engines which kindergarten children enjoy.)

BOOKS ABOUT AIRPLANES

SONGS

The Kindergarten Book Pitts, Glenn, Watters Ginn, New York 1949

The Airplane Page 134
I'm An Airplane Page 134

(Kindergarten - Things That Go)

(Source Materials - continued)

<u>The Sunflower Song Book</u>	Jane Norton	John Day Co.	1935
My Rocket Ship	Page 24		
<u>Singing Fun</u>	Wood and Scott	Webster Publish. Co.	1954
My Rocket Ship	Page 45		
<u>Sing and Play Book</u>	Ethel Crowinshield	Boston Music Company	1938
The Airplane			

RHYTHMS

<u>Music in Playtime</u>	Bentley & Mathewson	Clayton F. Summy	1948
Airplanes	Page 7		
Beacon Light	Page 9		
<u>Rhythms for Children</u>	Mary S. Shafer	A.S. Barnes	1938
Aeroplane	Page 30		
<u>My Picture Book of Songs</u>	Dalton-Ashton-Young	M. A. Donahue	1947
I'm A Pilot	Page 49		
The Air-o-plane	Page 49		

STORIES

<u>The Little Airplane</u>	Lois Lenski	Oxford University	1938
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POEMS

<u>Talking Time</u>	Scott & Thompson	Webster Pub. Co.	1951
Airplane			
Go! Go! Go!			
<u>Sung Under the Silver Umbrella</u>	Selected by ACE	Macmillan Company	1935
Up In The Air	James S. Tippet		
Wings and Wheels	Nancy Byrd Turner		

BOOKS ABOUT BOATS

SONGS

<u>Sing and Sing Again</u>	Ann Sterling Boesel	Oxford University	1938
Sail Boat	Page 50		

(Kindergarten - Things That Go)

(Source Materials - continued)

<u>The Kindergarten Book</u>	Pitt, Glenn, Watters	Ginn, New York	1949
Tugboat	Page 135		
<u>My Picture Book of Songs</u>	Dalton-Ashton- Young	M. A. Donahue	1947
The Motor Boat	Page 19		

RHYTHMS

<u>Music in Playtime</u>	Bentley and Mathewson	Clayton F. Summy	1948
Row, Boatman	Page 16		
<u>Rhythms for Children</u>	Shafer and Mosher	A. S. Barnes	1938
Row, Row, Row			

STORIES

<u>Little Toot</u>	Hardie Gramatky	Putnam
<u>Here & Now Story Book</u>	Lucy Sprague	
The Fog Boat Story	Mitchell	E. P. Dutton
<u>The Boats on the River</u>	Marjorie Flack	Viking

POEMS

<u>Talking Time</u>	Scott & Thompson	Webster Pub. Co.	1951
Tug Boat			
<u>Sung Under The Silver</u>			
<u>Umbrella</u>	Selected by ACE	Macmillan Company	1935
Ferry Boats	James S. Tippet		
Ferry Me Across The			
Water	Christina G. Rossetti		
My Ship and I	Robert Louis Stevenson		
Where Go The Boats	Robert Louis Stevenson		

BOOKS ABOUT MORE THINGS THAT GO

SONGS

<u>The Kindergarten Book</u>	Pitts, Glenn, Watters	Ginn, New York	1949
In A Bus We Come	Page 134		
I'll Skate on My			
Roller Skates	Page 32		

(Kindergarten - Things That Go)

(Source Materials - continued)

My Top	Page 128
The Clock	Page 125
The Telephone	Page 125

Sing and Sign Again

Ann Sterling Boesel Oxford University 1938

School Bus	Page 47
Rocking Horse	Page 53
Swinging	Page 36

Singing Fun

Wood and Scott Webster Pub. Company 1954

A Big Truck	Page 4
The Windshield Wiper	Page 46

Sing and Play Book

Ethel Crowinshield Boston Music Company 1938

The Fire Engine	Page 49
Fireman	Page 54
The Scooter	Page 19
Spinning Tops	Page 17
Merry-Go-Round	Page 19
Wind Mill	Page 26
The Clock	Page 26

The Sunflower Song Book

Jane Norton John Day Co. 1935
1956

The Fireman	Page 10
Mr. Wind	Page 8
The Blue Clock	Page 12

New Music Horizons

McConathy and others Silver Burdett 1944

The Merry-Go-Round	Page 8
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RHYTHMS

Rhythms For Children

Mary S. Shafer A.S. Barnes & Co. 1938

Swing Song	Page 42
Rolling Hoops	Page 21
Motor-cycle Cop	Page 17
Windmill	Page 18

Sing and Sing Again

Ann Sterling Boesel Oxford Univ. Press 1938

Teeter-Totter	Page 31
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(Kindergarten - Things That Go)

(Source Materials - continued)

Music In Playtime

Bentley & Mathewson Clayton F. Summy

1948

Bicycling

Page 12

Windmills

Page 58

Swaying Branches

Page 57

STORIES

Harold's Trip to the Sky

Crockett Johnson

Harper and Brothers

Mike Mulligan & His Steam
Shovel

Virginia Lee Burton Houghton-Mifflin Co.

Saturday Walk

Ethel Wright

William R. Scott

The Important Book

Margaret Wise
Brown

Harper and Brothers 1949

POEMS

Talking Time

Scott & Thompson

Webster Publish. Co.

1951

Merry-Go-Round

Hurry, Hurry

Stop For Me

Fire Engine

Here and Now Story Book

Lucy S. Mitchell

E. P. Dutton Co.

1921

Horsie Goes Jog-a-Jog

Auto, Auto

Automobile Song

Singing Words (Selected by Alice G. Thorn)

Scribner's

1941

Taxis

Rachel Field

Sung Under The Silver

ACE

Macmillan Company

1943

Umbrella

Lawn-Mower

The Swing

A Swing Song

Different Bicycles

Wings and Wheels

Skating

Stop-Go.

Dorothy Baruch

Robert Louis Stevenson

William Allingham

Dorothy Baruch

Nancy Byrd Turner

Herbert Asquith

Dorothy Baruch

AUDIO VISUAL AIDS

RECORDS

Songs From The Kindergarten Book

Ginn and Company

Our Singing World - Album K
Side 10 of Album K - About Singing Things

Mercury Childcraft Records

Field Enterprises

Choo Choo Train Ride

FILM STRIPS

Association of American Railroads

Washington, D.C.
(Transportation Building)

Tommy Takes A Train Trip
Railroads and Our Mail
Railroads and The Food We Eat

PICTURES

Portfolio of Train Pictures

(Supplied by Board of
Education)

Choo-Choo Panorama

Platt and Munk Company

GRADE ONE

SEASONS - CALENDAR - WEATHER

Concepts To Be Developed

Seasons

1. School begins in the month of September.
2. September is a fall month.
3. The fall months are September, October, November
4. Fall is a time of the year for plants and animals to prepare for winter.
 - a. Birds go south.
 - b. Trees lose their leaves.
 - c. Squirrels bury nuts.
 - d. People wear warmer clothing.
 - e. People put storm windows up.
 - f. Most plants go to seed until spring.
 - g. People harvest food for winter.
5. The days get colder and shorter.
6. There are sunny, rainy, cloudy, windy days in the fall.
7. The winter months are December, January and February.
8. Winter days are sunny, snowy, cloudy.
9. During the winter months -
 - a. We wear very warm clothing.
 - b. Most plants and animals sleep until spring.
 - c. The active animals have warm fur.
10. The spring months are March, April and May
11. During these months -
 - a. The days start getting warmer.
 - b. Birds come back from the south.
 - c. We wear lighter clothing.
 - d. The tree buds start growing leaves.
 - e. Sleeping animals wake up.
 - f. We plant seeds for flowers and food.
12. Spring days are sunny, rainy, cloudy, windy

(Grade I - Seasons - Calendar - Weather)

(Concepts - continued)

13. Summer months are June, July and August.
14. The summer months are a time for -
 - a. Plants to grow big and strong.
 - b. Wearing light clothing.
 - c. Staying outside a long time to play and grow. The days are long and very warm.
15. Summer days are sunny, rainy, cloudy, windy.
16. There are twelve months in the year.

Calendar

1. School starts during the month of September. There are 30 days in this month.
2. October comes after September.
3. We go to school five days - Monday, Tuesday, Wednesday, Thursday, Friday.
4. We stay home two days - Saturday, Sunday.
5. There are seven days in the week.
6. There are usually 30 days in a month.
7. There are usually four weeks in a month.

Weather

1. Rainy Day
 - a. A rainy day has certain characteristics: rain is falling, gray clouds are present, the sun usually is not visible.
 - b. Outer clothing made of rubber or plastic helps keep us and our clothing dry.
 - c. Wearing inner clothing that is wet may lead to illness.
 - d. Hold your umbrella back far enough so you can see.
 - e. Be careful when opening or closing your umbrella around others.
 - f. Be careful while walking during rain. You may slip and fall, and cars can't stop quickly on wet pavement.
2. Sunny Day
 - a. A sunny day has certain characteristics: the sky is clear or has very few clouds, the sun warms the earth.
 - b. Sunny days are especially good for outside activities.
 - c. We see shadows on a sunny day -- a shadow is the dark place made when something blocks the light.

(Grade I - Seasons - Calendar - Weather)

(Concepts - continued)

- d. The shape of the shadow is very much like the shape of the thing that blocks the light. The shadow may be smaller or larger than the thing that blocks the light.

3. Cloudy Day

- a. On a cloudy day clouds form between the sun and the earth. We cannot see through the clouds, but it is still shining and lighting the earth.
- b. If you were above the clouds, as in an airplane, you could see the sun.
- c. There are not always clouds.
- d. On clear days the clouds are white.
- e. On stormy days the clouds are gray and dark.
- f. Wind pushes clouds and changes their shapes.
- g. The sun shines on clouds and makes beautiful sunsets and sunrises.
- h. There are not shadows on a cloudy day.
- i. There are clouds at night. Sometimes they hide the stars.
- j. Clouds are bits of water droplets or ice particles.
- k. A cloud close to the ground is called fog.
- l. Some clouds are very high, others are not.

4. Windy Days

- a. The wind moves things like dust, paper and trees.
- b. Wind is moving air.
- c. When air is still, we have no wind.
- d. We can produce wind by moving air.
- e. When the wind moves slowly, it is a gentle wind.
- f. When the wind moves rapidly, it is a strong wind.
- g. Musical sounds are made by the wind.
- h. We can do many things on a windy day.

Problems

To give children understanding of the seasons, calendar and weather

Suggested Activities

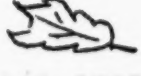
Seasons:

- 1. When does school begin?
- 2. How many days in September?
Have a large calendar in the room with the word "September" written in large letters. Count, with the children the number of days in September. If some children have birthdays during this month, count how many days until the birthday.

(Grade I - Seasons - Calendar - Weather)

(Activities - continued)

3. What are the fall months?
Have children bring leaves in...put under a paper and color with a crayon. The imprint of the leaf will come through. Draw leaves.
4. What are some things that happen during this month?

  The Fall Months  		
September	October	November
A child's picture going to school	A child's picture Halloween	A child's picture Thanksgiving
We come to school.	Who-oo. I will get you.	Thank you, God, for everything.

From magazines cut pictures of people and animals getting ready for winter. Place these pictures attractively on the bulletin board under the heading "Getting Ready for Winter" or "We Are Getting Ready for Winter."

5. What is happening to the temperature and the length of the days?
Have a large thermometer in the school room. Either listen to the radio or have a thermometer outside the window. On a chart put the weather for the day. Compare the weather with that of the preceding day. Compare temperatures of the beginning and ending of the week, and the beginning and ending of the month.
6. What is the weather like in the fall?
On the calendar chart put down the weather for the day. In order to have an effective chart compare the weather during the week and month. Take walks in the leaves. Notice changes in the plants, animals and the weather.
7. What are the winter months?
Make a chart for the winter months, including Christmas, New Year, Valentine's Day. Read "In Winter I get Up at Night" by R. L. Stevenson.
8. What is winter weather like?
Do the same here as with question 6. Emphasize safe practices to avoid falls on snow and ice.

(Grade I - Seasons - Calendar - Weather)

(Activities - continued)

9. What do plants and animals do to keep warm?
Have pictures of warm cozy homes, people dressed warmly, animals with fur. Talk about animals and plants going to sleep in winter. Discuss the best way for children to dress and keep warm.
10. What are the spring months?
Note such days as: St. Patrick's Day, April Fool's Day, Mother's Day.
11. What are some things that happen in the spring:
On the weather chart note that the days are getting warmer. Have children observe the birds coming back. Talk about the first bird. Go for a spring walk and write a story.
12. What is the Spring weather like?
13. What are the summer months?
14. What are some of the things that people and plants do now? Have pictures of people flying kites, riding bicycles, et cetera. Plant some seeds in the room and note how they grow. When you first plant the seed have children draw a picture of this activity, then of the plant in the different stages. Select one paper each time and place on the bulletin board so that anyone can see how fast plants grow. Put the date on picture.
15. What is the summer weather like?
Keep track of the time the sun rises and sets in winter and summer. Talk about it. The children will realize the days are longer in summer. The longer day with the sun shining is one reason why summer days are warmer. The sun warms the ground, water and air.
16. How many months in the year?
This should come late in the year after activities that relate to the calendar, weather and seasons have been completed. On a large bulletin place all the previous charts on the seasons. Children will readily see that there are four seasons. Have the children count the months. Games may be played to learn the order of the seasons. Choose four children, give each the name of a season. Then call spring and have the others line up in order. Have the children make a booklet during the year.



(Grade I - Seasons - Calendar - Weather)

(Activities - continued)

Calendar:

1. How many days in the month of September?
Count the days from a large calendar.
2. What month comes after September?
When you turn the page of the calendar you can mention the new month. Ask what special occasion occurs during this month. Pay attention to birthdays. Mark them on the calendar and count how many days the child has to wait. Make a large calendar on the blackboard. Do not write in the numbers; let the children do that. When they have observed and listened to the weatherman on the radio, record it by using these signs: (or any you wish)

an umbrella - rain
a snow man - snow
a sun - warm, clear day
a cloud - cloudy day

3. How many days do we go to school?
What are names of the days? You may make a chart like this: You might call it your "Weekly Newspaper."

Monday

Have a picture and a short story of something that happened that day such as birthdays, a walk, someone's new shoes, or a grasshopper someone found.

Learn the days of the week with the help of this song: "Days of the Week," page 14 of The American Singer.

4. How many days do we stay at home?
What are the days called? The above song will help here, too. Also discuss activities of the week-end. Children might draw pictures of their week-end before the discussion.
5. How many days in the week?
The above activities from numbers 3 and 4 will help here. Note the days on the calendar; then, count how many days in all.

Weather:

We have some kind of weather every day. It affects all our lives. We can see how it affects crops, traveling, ball games and picnics, sickness, forest

(Grade I - Seasons - Calendar - Weather)

(Activities - continued)

fires, the clothing we wear, and houses we build. It affects our emotions and activities. We can do little to control it so have to learn to live with it. People want to be informed about weather in order to know what to do. We are constantly hearing about weather on T. V., the radio, and in conversation.

In telling about the weather you tell:

1. How hot or cold it is
 2. Whether the sky is clear or cloudy
 3. Whether it is raining or snowing
 4. How much water is in the air
 5. How strong is the wind
 6. From what direction it is coming
-) First graders will not be
) too interested in these.
)
)
)

We see many aspects of weather such as:

fog	hail
clouds	rainbows
snow	sunrises
rain	sunsets
sleet	lightning

We hear:

thunder	wind
rain	hail

Here is a chart for the weather ... (This could be kept for the month)

<u>Weather Report</u>			
Rainy Days	Sunny Days	Snowy Days	Cloudy Days
lll	lll lll	l	lll lll
Today is <u>October</u> ____.			
It is rainy.			
Yesterday was: 68°		Today is: 69°	

(Grade I - Seasons - Calendar - Weather)

(Activities - continued)

If you want a more simple chart for the beginning of the year, make a child-size weather man. Record on a card the type of weather and place card on the brim of his hat. Have the day's temperature placed on a card in his hand.

Children might make a very large thermometer to be placed on a closet door. The thermometer could be as large as the door.

Weather:

1. Rainy Day

a. What is a rainy day like?

Notice one rainy day - how the day starts. Someone might ask where the rain comes from. Let children observe that there are always clouds on a rainy day and that the rain comes from them.

b. How do we dress on a rainy day?

Discuss the different experiences of pupils. How does it feel to get wet on a warm summer day? Refer to pages 11-12 in Science for Work and Play. Note one girl is protected from the rain and the other is not. What might happen if the girl does not change her wet clothes? Point out that each child should wear boots, rain cap and rain coat on a rainy day, that a rain coat should be bright so drivers can see one. Rainy days are dark. Refer to pages 13-14 in Science for Work and Play, for further preparation for rainy days.

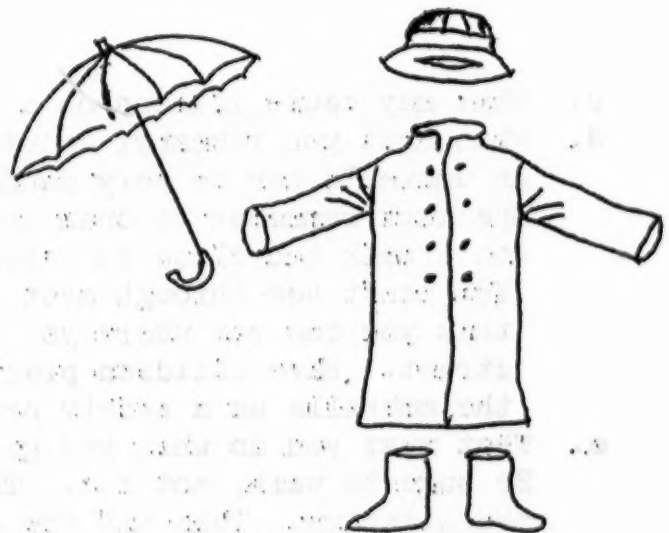
What will you choose
to wear on a rainy day

?

(Show by coloring it)

Tell why!

(Hektograph a sheet like this
for children's independent
work. Use it for class dis-
cussion.)



(Grade I - Seasons - Calendar - Weather)

(Activities - continued)

POEMS For Rainy Day

Rain

- R. L. Stevenson

The rain is raining all around,
It falls on field and tree,
It falls on the umbrellas here
And on the ships at sea.



Rain

- Helen Wing

I like to look out of my window and see
The rain dripping down on the leaves of a tree.
They shiver a little and bend in their places,
While Old Mother Nature is washing their faces.

- c. What may cause illness on a rainy day?
- d. What must you remember about an umbrella?
An umbrella can be very dangerous. The edges are sharp and one must remember to open and close it away from others. Also, don't walk too close to other children when carrying an umbrella. You can't see through most umbrellas. Carry the umbrella so that you can see where you are going, especially when on the street. Have children practice opening, closing and carrying the umbrella as a safety precaution.
- e. What must you do when you go outside on a rainy day?
Be sure to walk, not run. The grass and sidewalks and streets are slippery. Take all the safety precautions while crossing streets. The best place to play on a rainy day is inside. You can draw pictures, make scrapbooks, read, watch T. V., play games and do puzzles.

2. Sunny Day

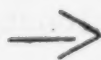
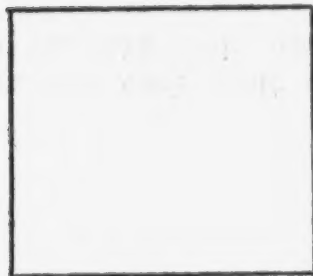
- a. What are the characteristics of a sunny day?
Take the children out on a nice day and let them just notice the

(Grade I - Seasons - Calendar - Weather)

(Activities - continued)

sun, absence of clouds and clear sky.
Your weather chart will come in here.

- b. Where is it nice to play on a sunny day?
Being outside in the fresh air and sunshine helps make one healthy. This also makes one feel good. Discuss games children play outside. Have them draw pictures of these experiences. Ask children how they feel in the out-of-doors. There are many, many poems that would apply here. "The Swing" by R. L. Stevenson is one.
- c. What do solid objects make when the sun can't shine through them? Take a screen outside and a board or book and see what happens. Most of the children know what a shadow is.



(Use child's picture or one from a magazine.)

The sun is shining.
See the shadows?
The sky is blue.
It is very warm.

- A good poem for this would be "My Shadow" by R. L. Stevenson.
- d. Is the shape of a shadow always the same?
Take a ball, a book, and a yardstick outside. The children will notice that the shadow takes the shape of the object. Walk around the playground to observe the different shadows. Find and list things that do and do not make shadows. Things that do make shadows are people, animals, trees, toys, clouds, airplanes and buildings. Things that do not make shadows are glass, cellophane, water and air.
Make shadows with a screen and a projector. Play shadow tag.
Make a shadow picture. Have light behind head of child, and have another person outline picture. Color it or paste on black paper.

3. A Cloudy Day

- a. Where is the sun?
Use a flashlight or lamp for the sun and a piece of wax paper to represent a cloud. Note that the light doesn't shine on the children. The paper is between the light and the children. However, the light is still shining. This experiment is on page 19 in Science for Work and Play.

(Grade I - Seasons - Calendar - Weather)

(Activities - continued)

- b. Are there always clouds?
Observe the sky at different times: morning, afternoon, evening.
Also observe on different days.
- c. Are all clouds the same size, shape and color?
Observe the clouds on sunny days, rainy days, snowy days, windy days. On clear days the clouds are white. On stormy days the clouds are gray and dark. The wind pushes clouds changing their shapes. The sun shines on clouds. This helps make beautiful sunsets and sunrises.
- d. Are there clouds at night?
Observe the sky at night.
- e. Can we see our shadows on a cloudy day?
While on the playground on a cloudy day, see if the trees and the building have shadows. See if shadows are around people.
- f. Do clouds come close to earth?
Clouds come right down to earth and then they are called fog.
The children will see the relationship once they are told.

Fog - Carl Sandburg

The fog comes
On little cat feet.
It sits looking
Over harbor and city.
On silent haunches,
And then, moves on.

- g. Are some clouds higher than others?
On a very windy day that is also cloudy, take the children outside. The clouds, closer to earth move faster and glimpses of the higher clouds can be seen.
- h. What are clouds?
Simply tell the children that clouds are bits of water droplets or ice particles.

Clouds - Christina G. Rossetti

White sheep, white sheep
On a blue hill,
When the wind stops
You all stand still.
When the wind blows
You walk away slow
White sheep, white sheep,
Where do you go?



- 4. A Windy Day
 - a. Is the wind able to move things?
We can observe the wind blowing leaves and paper along the street. Make kites and pin wheels to show that the wind moves things.

(Activities - continued)

Take a sheet of card board to fan bits of paper along the floor. Often when you stand outside, dust gets in your eyes. You also see bits of old paper being moved or blown about. Other things you see being moved by the wind are peoples' hats if they don't hold on to them, and branches of trees. You can see the flag blowing in the breeze. The wind blowing on lakes and oceans make waves. We can put water in a basin. Have the children blow the water to reproduce waves. Put a boat in basin and blow. Blow lightly, boat moves slowly, blow hard, it moves fast. People use windmills to pump water. The wind causes the rain to fall in a slanting direction. We, in the classroom, can fan the "rain" falling from a clothes sprinkler and cause it to fall in a slanting direction. Place a little sail boat in a basin of water and let children blow the boat as the wind would.

b. What is the wind?

Tell the children that the wind is moving air. You can sit in the room where the air is still. Let the children make and decorate fans and then fan themselves. They will move the air and thus make a small wind.

c. When the air moves slowly, do we have a wind?

Slow-moving air is a gentle wind or a breeze. The children can move their fans slowly then faster. They will then understand that the faster the movement, the stronger the wind.

d. What is the air like when it moves rapidly?

e. Does the air make any sounds?

You can hear the wind blowing through the trees and around buildings. Sometimes the wind has a crying sound and other times a pleasant comforting sound.

In the class room on a windy day, have the children listen to the different sounds they hear. Have them put these sounds to a rhythmic response. (Children have a natural feeling for rhythm which should be encouraged in the primary grades.) Sounds connected with weather can be interpreted by musical rhythmic activities. Use "Whispering Leaves" from Our First Music...Sing School Series (Birchard). For this activity make the sound of wind in dry leaves. Rub hands back and forth to make the sound of rustling leaves.

Use "Let Us Bend Down" for trees swaying in the breeze, (Teaching Physical Education in Elementary School by E. B. Salt).

Swing body from side to side like a tree swaying in the wind.

f. What makes air move?

This question is beyond observing. To aid in our search for causes, we need a piece of heavy thick cord or carpet yarn and a match. Light one end of the cord and blow it out. The smoke which is visible can be used to trace movements of air. Hold the smoke over a warm radiator or light bulb. See how much faster the smoke rises. Explain that it is being pushed by the upward warm, moving air. Hold the smoking cord next to a cold window pane or below a sauce pan of very cold water. The smoke stops rising and may begin to sink. Warm air moves up. Cold air moves down.

(Activities - continued)

POEMS For Windy Day

Little Red Leaves

Little red leaves are glad today,
For the wind is blowing them off and away.
They're flying here, they're flying there -
O, little red leaves you're everywhere!

Who Has Seen The Wind

- Christina Rossetti

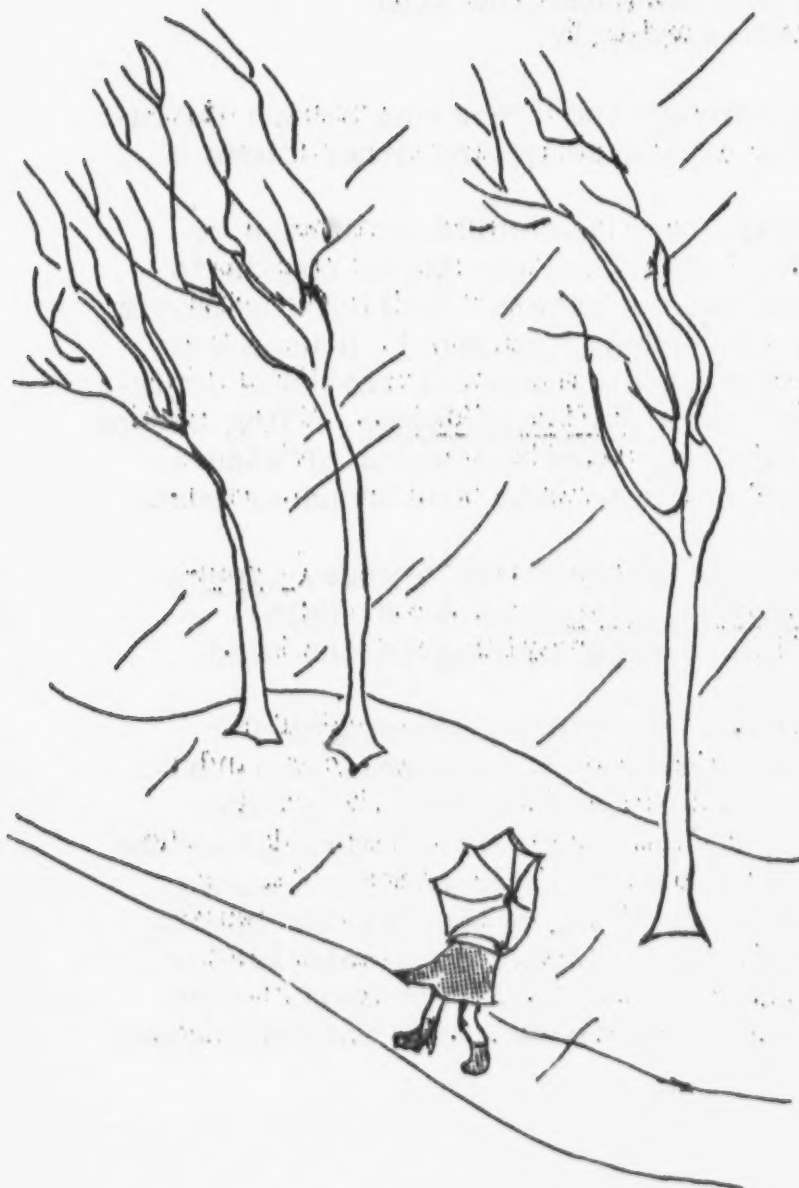
Who has seen the wind?
Neither I nor you
But when the leaves hang trembling,
The wind is passing through.

Who has seen the wind?
Neither you nor I
But when the trees bow down their heads,
The wind is passing by.

The Sound of the Wind

- Christina Rossetti

The wind has such a rainy sound,
Moaning through the town,
The sea has such a windy sound,
Will the ships go down?
The apples in the orchard
Tumble from the tree,
Oh, will the ships go down, go
Down,
In the windy sea?



(Grade I - Seasons - Calendar - Weather)

REFERENCE BOOKS FOR TEACHERS

<u>Author</u>	<u>Title</u>	<u>Company</u>	<u>Date</u>
Bell, Thelma Harrington	<u>Snow</u>	Viking	1954
Blough, Glenn	<u>Doing Work</u>	Row, Peterson Co.	
Craig, Gerald S.	<u>Science for Elementary Schools</u>	Ginn and Co.	1947
Fenton, C. and Fenton, M.	<u>Our Changing Weather</u>	Doubleday & Co.	1954
Greenlee, Julian	<u>Teaching Science to Children</u>	William C. Brown Co.	1951
MacNeil, Marion Gill	<u>Between Earth and Sky</u>	Oxford Univ. Press	1944
Parker, Bertha	<u>Clouds, Rain and Snow</u>	Row, Peterson Co.	1941
Parker, Bertha	<u>The Ways of the Weather</u>	Row, Peterson Co.	1950
Parker, Bertha M.	<u>Science Experience-Elementary Schools</u>	Row, Peterson Co.	1952
Thomas, Eleanor	<u>Weather</u> (Little Wonder Book, 510)	Charles E. Merrill	1946
Whitman, Albert	<u>The Ladder of Clouds</u>	Children's Science Series	1939
Zim, Herbert S.	<u>Lightening and Thunder</u>	William Morrow	1952
Wyler, Rose	<u>The First Book of Weather</u>	Franklin Watts, Inc.	1956

BOOK LIST FOR CHILDREN

Beauchamp-Crampton- Gray	<u>Look and Learn</u>	Scott, Foresman Co.	1949
Beim, Lorraine	<u>Sunshine and Shadow</u>	Harcourt, Brace Co.	1952
Beauchamp, Wilbur - Crompton, Gertrude	<u>Science Stories, Book One, Weather, pages 35-47</u>	Scott, Foresman Co.	1933
Blough, Glenn	<u>Not Only for Ducks</u>	McGraw-Hill Book Co.	1954
Blough, Glenn	<u>The Story of Rain</u>	McGraw-Hill Book Co.	1954
Blough, Glenn	<u>Wait for the Sunshine</u>	McGraw-Hill Book Co.	1954

(Grade I - Seasons - Calendar - Weather)

(Book List for Children - continued)

Bowen	<u>Snow for Christmas</u>	Vernan McKay	1953
Brown, Margaret Wise	<u>Winter Noisy Book</u>	W.R.Scott, Inc.	1948
Burton, Virginia L.	<u>The Little House</u>	Houghton-Mifflin Co.	1953
Craig, G.S. and Bryan, B. C.	<u>Science Near You</u>	Ginn & Co.	1956
Craig-Daniel	<u>Science Around You</u>		
Goldberg, Martha	<u>Wait for the Rain</u>	Holiday House	1952
Kohler	<u>The Sun Shines Bright</u>	Gulilly House	1956
Parker, Bertha M.	<u>The Basic Science Education Series:</u> <u>Winter Is Here</u> <u>Fall Is Here</u> <u>Spring Is Here</u> <u>Summer Is Here</u>	Row, Peterson Co.	1948
Paull, Grace	<u>Snowed-In Hill</u>	W. S. Konecky	1953
Schlein, Miriam	<u>Go With The Sun</u>	Scott	1952
Thorn & Harbeck	<u>Let's Find Out</u>	Beckley-Cardy	1951
	<u>Let's Look Around</u>	Beckley-Cardy	1952
	<u>Let's See Why</u>	Beckley-Cardy	1953
Thurber, Walter A.	<u>Exploring Science</u>	Allyn & Bacon, Inc.	1956
Frazier, G.W. and Dolman, H.	<u>Sunshine and Rain</u>	Singer Co.	1937
Frazier, G. W.	<u>Through the Year</u>	Singer Co.	1947
Frazier, G. W., MacCrocker, H. D. Decker, D. G.	<u>We Ask</u> - page 15	Singer Co.	1955
	<u>We See</u>	Singer Co.	1947
Tresselt, Alvin	<u>Follow the Wind</u>	Lathrop, Lee and Shepard	1950

(Grade I - Seasons - Calendar - Weather)

(Book List for Children - continued)

Tresselt, Alvin	<u>Rain Drop Splash</u>	Lathrop, Lee & Shepard Co., Inc.	1946
Wavle, Ardin Soule	<u>Rain and Sunshine</u>	Heath Company	1942
Zion, Gene	<u>All Falling Down</u>	Harper and Brothers	1951
Zoloton, Charlotte	<u>The Storm Book</u>	Harper & Brothers	1952
	<u>The Wonder World of Science</u>		
	<u>Out of Doors</u>		
	<u>We Look About Us</u>		

SUPPLEMENTARY TEXTBOOKS

Frazier, G. W. and Dolman, H.	<u>Sunshine and Rain</u>	Singer Company	1937
Frazier, G. W., MacCrocker, H., Decker, D. G.	<u>We Ask</u>	Singer Company	1955
Parker, Bertha	<u>Basic Science Educational Series</u>	Row, Peterson Co.	1948

AUDIO - VISUAL AIDS

FILMSTRIPS

Filmstrip - Weather

Akron Public Library
(Under Science - page 22)

Filmstrips (6) - First
Experiments About Weather:

Jam Handy Organization

1. What is an experiment?
2. How Does Water Get Into the Air?
3. What Makes Things Dry Faster?
4. Where Do Clouds Come From?
5. What is Wind?
6. Why is the Night Cooler Than The Day?

Filmstrip - Season of the Year - 11 minutes

Blow Wind, Blow - one reel, colored, B/W

Why of Elementary Science - Set No. 1 (4 strips in color,
Why Does It Rain? Filmstrip House)

(Grade I - Seasons - Calendar - Weather)

(Audio - Visual Aids - continued)

Why Do We Have Wind?

Why Do We Have Warm and Cold Days?

Why Do We Have Day and Night?

How Does Weather Help Us? - one reel - Coronet Films C - B/W

Filmstrip - What Makes Rain? - 10 minutes

Filmstrip - Winter On The Farm - 11 minutes

RECORDS

1. My Playmate, The Wind

Young Peoples Record 4501 - 78 or 45 rpm

2. Daisy and The Wind - The Singing
Program

R.C.A. Album E 83 - 78 rpm
WE 83 - 45 rpm

(Grade 1 - Work and Play with Water)
(Concepts - continued)

GRADE ONE

28. Water can change things.
29. Some things dissolve in water.
30. Some things do not dissolve in water.

WORK AND PLAY WITH WATER

Concepts To Be Developed

Science For Work and Play

D. C. Heath Company

pp. 53-63

1. We use water at school and at home.
2. We use water for drinking, washing, cooking and for many other purposes.
3. All living things need water.

p. 55

4. Pipes carry water to all the parts of the home where it is needed.
5. Water heaters heat our water.
6. We find water everywhere.
7. People use water to work.

p. 56

8. Some things will float in water; some things will sink.
9. Things that are light for their size will float; things that are heavy for their size will sink.
10. Water has lifting power.
11. Salt water has greater lifting power than ordinary water.

p. 57

12. Boats will float on water.
13. People can learn to swim.

pp. 58-59

14. Water evaporates.
15. Water evaporates indoors as well as outdoors.

pp. 60-63

16. When water evaporates, it goes into the air. We cannot see it in the air, but it is there.
17. Wind makes water evaporate more quickly.
18. Heat makes water evaporate more quickly.
19. Rain is water. Rain comes from the clouds.
20. Rain water evaporates and goes up into the air again.
21. Evaporation takes place only where water touches the air.
22. We can get water out of the air.
23. We can make rain.
24. Rain has many forms - dew, frost, rain, snow, et cetera.
25. Our city uses water.
26. Water is important to us.
27. We use water for transportation.

(Grade I - Work and Play With Water)

(Concepts - continued)

28. Water can change things.
29. Some things dissolve in water.
30. Some things do not dissolve in water.

Suggested Approach

Talk about ways we use water: In school, at play, at home.

Take a walk in the neighborhood to see the uses of water.

On a rainy day observe the children's wet clothing. Does it dry? What happens to the water?

After a rain, notice the puddles. Observe that they disappear. Where do they go?

Daily events in the classroom lend themselves to a possible approach, such as observing paints drying, watering the plants, getting a drink.

List the places where we find water.

Suggested Activities

Observe picture on page 53, Science for Work and Play.

Problem 1: How do we use water in school?

Refer to picture, page 53 - Science for Work and Play.

Discuss how we use water at school.

Make a chart of all the ways we use water in school.

- a. Washing hands
- b. Watering the plants
- c. Washing the boards
- d. Painting pictures
- e. In the aquarium
- f. Drinking from the fountain, et cetera.

Have the class make pictures to illustrate the chart and also ones to label for themselves.

Collect pictures, mount under "Water In School."

Trip through the school building and around grounds will show many examples of water in use.

We Use Water In School

1. We water our plants.
2. We wash the boards.

Water In School

Pictures to Illustrate
Above

(Grade I - Work and Play With Water)

(Problems - continued)

Problem 2: How do we use water at home?

Note picture on page 54, Science for Work and Play.

Make a chart of all the ways of using water at home and compare with the ways of using it in school.

- a. Getting a drink from the faucet
- b. Mother cooking a meal
- c. Washing selves, bath
- d. Brushing teeth
- e. Watering the grass, flowers (sprinkler)
- f. Watering the plants inside
- g. Washing the car
- h. Washing clothes - ironing
- i. Scrubbing floors, et cetera

On a large paper on the board have children draw all the ways water could be used at home.

Mount pictures class collects, under caption "Water at Home."

Take a trip through the neighborhood to see other examples of water in use in or around the home.

For the bulletin board you can do this:

Use the poem "Windy Wash Day" by Dorothy Aldis, "The Sprinkler" by Dorothy Aldis and "Washing" by Robert Louis Stevenson.

Problem 3: From where does our water come?

Observe and discuss the picture on page 54 in textbook.
Ask the children:

How many have seen these pipes in your basement?

How does water get into the pipes in the basement?

How does it get from that pipe to the faucet outdoors?

Help children see that the pipe goes through the wall to the basement.

Help them see that the pipe takes the water into the basement, up the wall, and out through the faucet.

Problem 4: How do we get hot water?

Help class to see the hot water heater in textbook.

Have them discuss the advantages of hot and cold water.

Cold water is good for drinking and watering the grass.

Hot water is better for washing.

We Use Water At Home

1. We brush our teeth.

Water At Home

Pictures to Illustrate

WAYS WE USE WATER

Use pictures to illustrate.

(Grade I - Work and Play With Water)

(Problems - continued)

Explain that the hot water heater heats the water so that it will be warm for our use.

If feasible have the class inspect the water-heating equipment at school. This should be kept on a very simple level.

Problem 5: Where do we find water?

Help class understand that water is all around us.

Besides using it in our homes and schools, we find it in lakes, oceans, pools, wells and swamps.

Water is in the air we breathe, the food we eat, and in our bodies. Help children to understand this on their level.

We find water in the ground. It is also in the sky.

Where We Find Water

1. We find water in lakes.
2. We find water in wells.
- 3.
- 4.

Illustrate

Problem 6: How do people use water to work?

Explain why we have dams and reservoirs. Use pictures of these and stories about them to make them seem more real. Introduce the book The Water That Jack Drank.

If possible, take a field trip to see a reservoir lake, or dam.

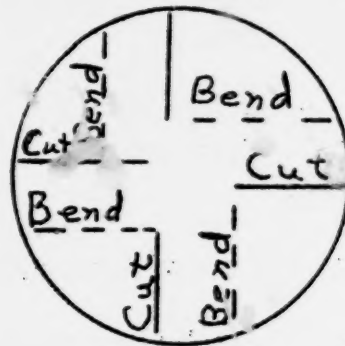
To show the power of water and what it can do, build a water wheel.

Materials needed: A milk carton
A toothpick or match

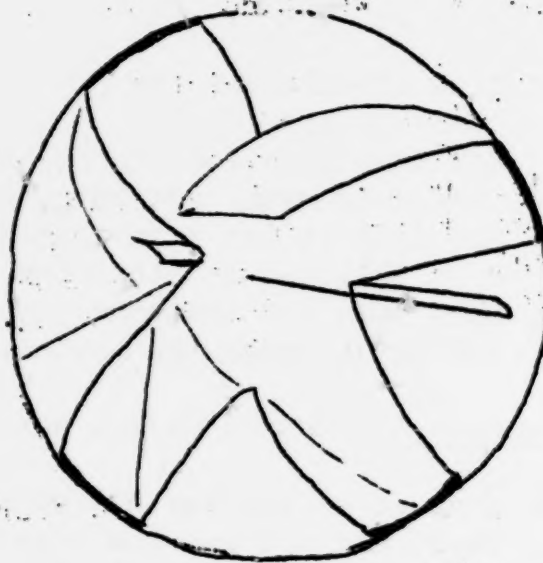
Cut off one side of the carton and make a circle out of it. Make two lines on the circle. Cut down the lines part way and bend the flaps. Insert the toothpick into the center (sharpen both ends).

Hold it under the faucet and turn on the water so that it flows on the wheel, forcing it to turn.

In the book More Power To You, you will find other ways water helps workers that may be presented to children.



Water Wheel



(Grade I - Work and Play With Water)

(Problems - continued)

Problem 7: What other workers use water?

Help children list others who use water:

Firemen Doctors
Dentists Street Cleaners
Et cetera

Have the class help with the bulletin board or with charts on "How workers use water."

Use records: "The Fireman" page 78
"Fire Engine" page 78

There are also songs in the First-Grade Book.

Problem 8: Why do some things sink and others float?

Since it is difficult to give children of this age a reason why some things float and others do not, compare things of about the same size and help them draw the correct conclusions.

Experiment to see which objects will float and which will sink.

Materials needed: pan of water, apple, pencil, spoon, marbles, rubber duck, penny, stone, piece of paper, feather and a paper clip.

After testing the objects to see which will float, make a chart. On one side list the things which will float, and on the other side list the things which will not float.

In Thurber's Exploring Science use the experiments - pages 124, 125, 128, 129.

Materials needed for first experiment:

Pan of water, empty tin can, and sand.

Show that the empty can will float. Put the sand into the can and note that it sinks. Draw the conclusion that by putting the sand into the can we made the can heavier than the water and, therefore, it sank to the bottom.

Workers Who Use Water

1. Firemen use water.

The books Steamboat Billy and I Want to be a Fisherman are useful.

These will float: These will not float:

A pencil	The penny
A rubber duck	The stone
A piece of paper	Marbles

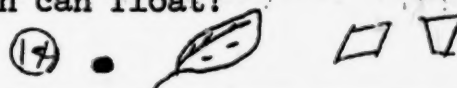


Sally dropped a penny, a stone, a feather, a piece of paper and a cork in the water.

Some things are lighter than water. They can float.

Some things are heavier than water. They cannot float.

Which can float?



(Grade I - Work and Play With Water)

(Problems - continued)

Materials needed for the second experiment:

A pan of water and two jars or bottles.

Place an empty jar in the water and note it floats. Place a full jar in the water and note that it sinks. Have the class understand that it is the weight of the bottle that makes it sink when it is full.

Third experiment that the class would enjoy. Place a rubber toy in the water. It will float. Squeeze the toy and replace the air inside it with water. The toy will sink. The toy will sink if the air inside is replaced by water.

Problem 9: What other object will float?

Have the class discuss other things that cannot be immediately tested.

- a. dogs
- b. people
- c. boats, et cetera

Observe the picture on page 57. Point out that mother and father are helping the children enjoy the water and are teaching them how to swim.

Use this opportunity to bring in water safety rules. A list or a chart and pictures illustrating these rules would be very good.

Use the book A Goat Afloat.

Read the poem "At The Seaside" by Robert L. Stephenson or A Sea Song From the Shore by James W. Riley.

Problem 10: Does water have lifting power?

Help children see that water has lifting power. Perform an experiment using brick, string and a pail of water to demonstrate this fact.

Fasten a string to a brick and lower it into the pail of water. Have a child lift the brick out of the water, then have him lift it in the water. Help children realize that the brick is lighter in the water.

Our Water Safety Rules

1. Always walk on the beach.
2. Never go swimming alone.
- 3.

Illustrate

(Grade I - Work and Play With Water)

(Problems - continued)

Explain that salt water has greater lifting power

Help children understand that some water (the oceans) have salt in them.

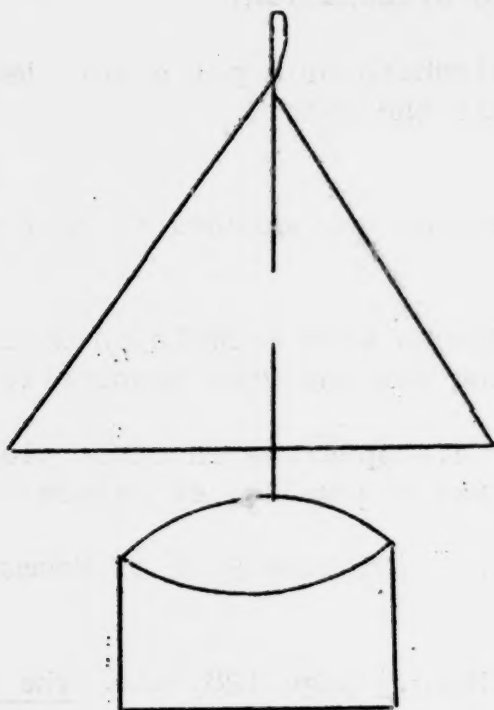
Show that salt water has greater lifting power than ordinary water by performing the following experiment:

Materials Needed: Two glasses, bar of soap, knife, salt.

Fill both glasses with water. Into one pour quite a bit of salt. Let it dissolve. Cut two pieces of soap from an ordinary bar and place one in each glass. In which kind of water does the soap float best?

Art Activity

Make a boat that will float by using a cork, a needle and paper.



Read the poem: "Where Go The Boats" by Robert Louis Stevenson

Dark brown is the river,
Golden is the sand.
It flows along forever,
With trees on either hand.

Green leaves a-floating,
Castles of the foam,
Boats of mine a-boating--
Where will all come home?

On goes the river
And out past the mill,
Away down the valley,
Away down the hill.

Away down the river,
A hundred miles or more,
Other little children
Shall bring my boats ashore.



(Grade I - Work and Play With Water)

(Problems - continued)

Problem 11: Where does the water go?

Have class observe picture on page 58 in textbook.
Have a discussion about the picture.

Observe the rain equipment.

The puddles in the street will help them to understand that it has been raining. Use questions:

Do you think it has stopped raining?

What has happened to the water?

Lead the class to understand that some of the water has dried away.

Tell them this is called evaporation.

Have the class observe a birdbath or a pet dish. Raise the questions:

Did the animals drink all the water?

Where did it go?

Soil that is dry can be watered and watched to help children see that the water disappears.

Use children's past experiences with animals in discussing this problem. Ask about their pets getting wet and what happens to the water?

Help class to notice water disappearing in other places such as the sandbox, puddles in the road, wet sidewalks, et cetera.

Introduce poems: "The Rain," "Picture Book of Poems," "Mud," - Polly Chase Boyden.

Use song, "Walking in the Rain," page 128, and The Storm Book.

Water Disappears From -
Our clay
Our paints
Our sandbox
Our bird bath.

It goes into the air.

Problem 12: Does water evaporate indoors?

Have children see that water evaporates indoors. Refer to page 59 in textbook.

Have them find the objects from which the water has evaporated in the classroom. Help them to find evidence of evaporation.

(Grade I - Work and Play With Water)

(Problems - continued)

Note we are sorry that the water has evaporated from paints.
We are glad it evaporated from the clay.
We are glad it evaporated when we washed our desks and tables, et cetera.

Discuss what happens to the water when it evaporates. Use the experiment on page 60 of Science For Work and Play.

Materials needed: Two jars and two wash cloths.

Have two jars standing side by side, place a washcloth in each one. In one jar pour in some water. Leave the other jar just as it is. Place the lids on the jars.

Observe the jars the next day. There are water drops in the jar in which we placed the water, but not in the other. Open the jars. In the jar with the water we can see drops of water and the cloth is wet. This wetness must come from the water. Thus, the water has not evaporated. Why?

Next remove the lids from the jars. Leave overnight. The next day the washcloth is dry. The water has evaporated. Help the children to understand that the lid prevented the water from going into the air. When the lid was left off, the water evaporated into the air.

Problem 13: How fast does water evaporate?

Have the class look at picture on top of page 61 in textbook.

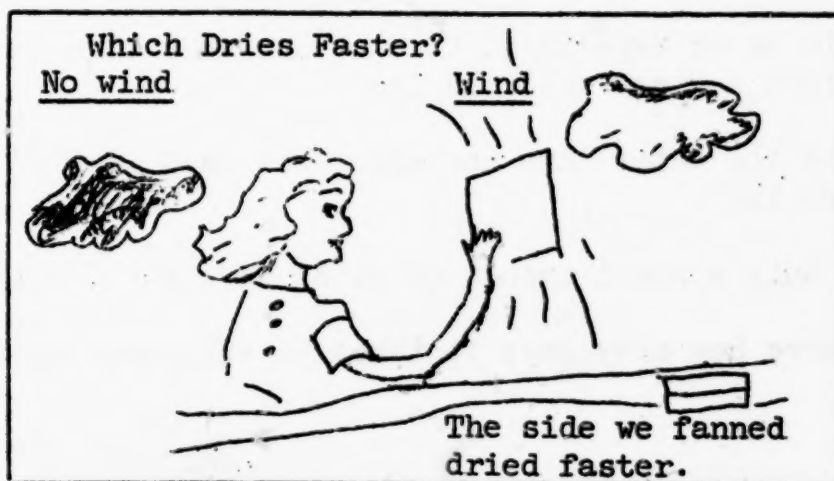
We know by our experiments that water evaporates into the air. Note that sometimes this happens slowly, sometimes quickly.

Observe the wind blowing the clothes. The water will evaporate and they will dry. Observe the puddles under the dresses.

Help the children to see that the trees are being moved by the air as are the clothes.

Have the children discover what has happened in the picture at the bottom of the page.

Wet the blackboard in two places. Fan one place until it dries. Note which place dries the faster.



(Grade I - Work and Play With Water)

(Problems - continued)

Help children to understand that water will evaporate faster when the air is moving, that clothes will dry faster outside when the air is moving them.

Repeat poem "Windy Wash Day."

Note that evaporation takes place only where water touches the air.

Have the class think about puddles they have seen after a rain. If possible, observe puddles in the school yard after a rain.

Observe that a large shallow puddle will dry more quickly than a small deep one. If you do not wish to wait until a rain to prove this, try this experiment.

Materials needed: A jar with a lid, a jar without a lid, a pie plate or shallow dish and a bottle with a narrow neck.

Place water in all of these.

Note that: The water inside the closed jar cannot evaporate because the water cannot get to the air outside.

The water in each of the other containers will evaporate at different speeds. The first to evaporate is the water from the shallow dish.

Which Will Evaporate First?



Four Days Later



The water is gone from the shallow dish.

Hang some freshly-washed doll clothes up to dry. Put some outdoors and others in a sheltered place. Note which dry faster.

Use this as an experiment to show how much time it will take for water to evaporate from a glass into the air:

Place the water into the glass and mark it with a label to indicate the water line.

Use only a small amount of water so that it will evaporate quickly.

Observe how many days it takes to evaporate and record the time.

(Grade I - Work and Play With Water)

(Problems - continued)

THESE TWO EXPERIMENTS ARE ON PAGE 8 OF
SCIENCE NEAR YOU.

Show that water needs air to evaporate.

Have two jars with the same amount
of water in each. Cover one jar and
leave the other uncovered.

On a chart illustrate the experiment
and the results.

Point out the relationship between
these experiments, showing the effect
of air upon water and the drying of
paints, paste, clay, et cetera.

CHART

When Will The Water Disappear?

Tuesday	1 day	
Wednesday	2 days	
Thursday	3 days	
Friday	4 days	

It took the water four days
to evaporate.

Chart

WHAT WILL HAPPEN?

	Cover	No Cover
May 4		
May 8		
May 12		

The water stayed in the jar
with the lid. It evaporated
from the jar without the lid.

Problem 14: Does water evaporate more
quickly when it is warm?

Show the class the pictures on the top of page 62 in the textbook. Note that
the girl has placed a pan in the sun and a pan of water in the shade. The pan
in the sun is being warmed, the one in the shade is not.

Help the children to understand that the girl must leave the water for a
while to give it time to evaporate.

Have the children look at the bottom picture on page 62. Call attention to the
two pans - one on the radiator and the other on the hot plate.

Help children to realize that both pans are being warmed, but the one on the
hot plate is being warmed more than the other.

(Grade I - Work and Play With Water)

(Problems - continued)

Have the class do the experiment themselves.

Use pans about the same size. Put the same amount of water in each. Use only about one cupful of water to hasten the experiment. Leave the pans for a while. Later, observe that there is less water in the pans on the hot plate, in the sunny place and on the radiator than in the pan in the shady place.

Draw the conclusion that water evaporates faster when it is warm. That's why we stand near a radiator to get clothes dry after we have been in the rain. Have children note that there is less water in the pan on the hot plate than in the pan on the radiator, and less water in the pan on the radiator than in the pan in the sunny place. Explain that the hot plate makes the water warmer than does the radiator and also the radiator makes the water warmer than the sun does.

Draw the conclusion that the warmer the water, the faster it evaporates.

Problem 15: What happens to the water after it goes into the air? (Page 63 in text.)

Help the class to realize what is happening in the first picture on the page. That the rain is coming down. Notice clouds, and the puddles.

Have the children see that in the bottom picture the rain has stopped and the sun is shining. Notice that much of the water has evaporated. The sun and perhaps a breeze have helped much of it to go up into the air.

Help the children to understand that the water evaporates and goes up and then comes down again in the form of rain.

Explain to the class that as the water rises it is warmed by the sun. When the drops cool they collect into slightly larger drops. These form clouds.

When they cool still more, they become too heavy to stay in the air, so they fall as rain.

Use the poem "Rain" by Robert L. Stevenson.

Problem 16: Can we get water out of the air?

Prove that there is water in the air. Have children do this experiment:

Put 10 ice cubes in a jar and fill it with water. Cover the jar and let it stand. In a short while, the outside will be wet. Dry the glass and it will become wet again.

Ask "Where does the water come from?" Help the children understand that the jar is watertight and no water was spilled; that the only place the

(Grade I - Work and Play With Water)

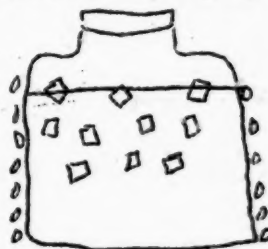
(Problems- continued)

water could have come from was out of the air.

(The vapor in the air hits the cold jar, clumps together and forms water droplets.)

We Can Get Water Out of The Air

1. We put 10 ice cubes in a jar.
2. We covered the jar.



3. In a little while, the jar was wet.

We got water out of the air.

Have the class observe the dew on the grass early in the morning when it is cool. As the day grows warmer, the dew evaporates and turns into vapor again.

Problem 17: How can we make rain?

Perform this experiment to make rain.

Materials needed: a dry jar and a tea kettle filled with water.

Note that when the water is heated it evaporates.

Call attention to the steam that forms. Hold the jar over the spout of the kettle. Droplets will gather inside the jar and the children will be able to see them. These droplets will come together and grow larger. They will fall down like regular raindrops.

You can also do this experiment with a cold plate. The result is the same.

Song: "It's Raining," page 44, American Singer.

We Can Make Rain



We made rain by boiling water.
See the little drops.

(Grade I - Work and Play With Water)

(Problems- continued)

Problem 18: What forms of water are in our weather?

Dew. Dew comes at night from the air. Water vapor condenses to make dew.

Frost. Have class tell what they know about frost: how it looks, when it comes, et cetera.

Dew and frost both come out of the air. Dew is water and comes out of cool air. Frost is ice and comes out of freezing cold air.

Help class to tell about the pretty pictures frost makes on the windows. Note that frost disappears when the sun comes out. The warm air melts the frost.

Sing the song "Jack Frost," page 73.

Rain. Have children tell what they have learned about rain.

Put a pan outside during a rain and see how much water will fall into it. Sing "A Rainy Day," page 39, American Singer.

Fog. A fog is made of many, many drops of water. It is just like a cloud.

It often comes in a cool evening or a cool morning.

Clouds. Help children understand that there is water in these clouds. If the water evaporates, the clouds disappear. If the water does not evaporate, the clouds pile up and we have rain.

Snow. Have the class talk about snow as a form of water. Explain that we have snow only when the air is freezing cold.

Talk about the size and shape of snowflakes.

Watch snow, hail or sleet turn into water when it is brought inside.

Watch water freeze in a pan on a cold day, or place water in the refrigerator.

Observe icicles hanging outside. Bring one in and watch it drip.

Hail - sleet.

Problem 19: Does our city use water?

Have children discuss how the whole city uses water and where it comes from.

Lead them to realize that a building needs more than the few pipes that they have seen in their basements.

(Grade I - Work and Play With Water)

(Problems- continued)

Help them to realize that under the streets in the city is a water main that brings water into our homes, the buildings downtown, schools, et cetera. All of our water comes from this main through pipes, into our homes and the other buildings.

Explain to the class that pipes carry water from a reservoir where water is stored; that before we use this water it must be cleaned.

Discuss briefly the sewer system. Explain that after we use our water it leaves the house in a pipe and goes into the sewer under the street. These pipes take the dirty water far away.

(If you wish, you may tell them that it goes to a Sewage Plant where it is pumped and sprayed to take out the waste which is used for fertilizer. The water that is left is clean enough to go into a nearby river where the sun finishes the job of cleaning it.)

Problem 20. How is water important to us?

Have class list all of the ways again that we use water. Help them to realize that it is necessary for us to live.

Bring in a health exercise on how much water we need every day.

Help children to learn that all living things need water and without it they will die.

Use two plants to show what happens when plants do not get water.

Select two plants that are alike.

Water one, but do not water the other.

Let the children see what happens when a plant does not get water.

Problem 21. How do we use water for transportation?

Transportation is another use of water.

Bring to the attention of the children that boats float. Have them list all of the kinds of boats they know.

rowboats	ferryboats
speedboats	oceanliners
	et cetera

Discuss uses of boats.

for work
for play

(Grade I - Work and Play With Water)

(Problems - continued)

Use poem "Ferryboats" by James S. Tibbett.
Use poem "Where Go The Boats" by Robert L. Stevenson.

Problem 22. How does water change things?

Some things dissolve in water.

Encourage class to talk about water and how sugar and salt dissolve in it.

Refer to page 38 and page 39 in Science Near You, which shows children making lemonade.

Explain what happens to the sugar when it is added to the lemonade.

These things dissolve in water.	These things do not dissolve in water.
sugar	sand
salt	pebbles
cocoa	flour

Make a list of all the things that can be dissolved in water. Also all of the things that cannot be dissolved in water.

Test objects that can and cannot be dissolved in water. Here is a list that you might use.

sand

pebbles

sticks

leaves

paper

cocoa

rice

paste

flour

salt

sugar

POEM: "The Sprinkler."

The Sprinkler is what's fun to see
Underneath our big elm tree.

It whirls around its big wet drops
First on my mother's pretty phlox
And last on father's hollyhocks.

And all their little faces get
So very, very nice and wet.

And when no one is there to see
I run and get some drops on me.

- Dorothy Aldis

(Grade I - Work and Play With Water)

Teachers' References

<u>Books</u>	<u>Author</u>	<u>Publisher</u>	<u>Date</u>
<u>Elementary School Science and How To Teach It</u> , pp. 183-184	Glenn O. Blough	The Dryden Press	1951
<u>Everyday Weather and How It Works</u> , pp. 44-59	Schneider Bendick	Whittlesey-McGraw-Hill	1951
<u>More Power To You</u>	Herman & Nina Schneider	William R. Scott, Inc.	1953
<u>Science Experiences for Little Children</u>	Gavinson, Charlotte		
<u>Science Experiments for Children</u> , pp. 12-17	Peter Brem	Kenyon Press Pub. Co.	1937
<u>Science for The Elementary-School Teacher</u> , pp. 212-214	Gerald S. Craig	Ginn and Co.	1947
<u>Science Fun With Cartons</u>	Herman and Nina Schneider	Whittlesey House	1953
<u>The First Book of Science Experiments</u> , pp. 28-31	Rose Wyler	Franklin Watts, Inc.	1952
<u>The First Book of Water</u>	Jo and Ernest Narling	Franklin Watts, Inc.	1952

Children's References

<u>Books</u>	<u>Author</u>	<u>Publisher</u>	<u>Date</u>
<u>All Around You</u>	Jeanne Bendick	Whittlesey House	1951
<u>At The Harbor</u>	Colonus and Schroeder	Melmont Publishing, Inc.	1953
<u>Fireman Fred</u>	Jene Barr	Albert Whitman and Company	1952
<u>Let's Go To The Seashore</u>	Harriet E. Huntington	Doubleday and Company	1941
<u>I Want To Be A Fisherman</u>	Carla Green	Children's Press	
<u>Steamboat Billy</u>	Stanford Tousey	Doubleday, Doran & Co.	1940

(Grade I - Work and Play With Water)

(Children's References - continued)

<u>The Storm Book</u>	Charlotte Zolotow	Harper & Brothers	1952
<u>The True Book of Policemen and Firemen</u>	Irene Miner	Children's Press	1954
<u>The True Book of Science Experiments</u>	Illa Podendorf	Children's Press	
<u>The Water That Jack Drank</u>	William R. Scott	William R. Scott, Publisher	1950
<u>We Look About Us, Book I</u>	Gerald S. Craig	Ginn and Company	
<u>Winter Comes and Goes, Book II</u>	George Grasier		1938
<u>White Snow, Bright Snow</u>	Alvin Tresselt	Lathrop, Lee and Shepard Co., Inc.	1947

Home-Made Science Equipment

Bridge or Roadway Over Water

Can be found in Science Fun With Cartons by Herman and Nina Schneider, Whittlesey House, 1955, pp. 14-78.

Films

Water Safety	10 minutes	(These can be found at the Main Library.)
Safe Swimming		

Songs

Songs From The First-Grade Book:

Records:

	<u>Page</u>	<u>Record Number</u>
"Walking In The Rain"	128	6B
"Fire Engine"	78	5B
"Fireman, The"	78	5B
"It's Raining"	126	6B
"Jack Frost"	73	7A
"Let's Go Skating"	28	2A
"Over The River"	91	3B

Songs From The American Singer:

"A Rainy Day"	39
"It's Raining"	44

GRADE ONE

SAFETY

(FIRE)

Problem 1: How can fire be prevented?

Concepts

With care, fires can be prevented.

Fire drills are important.

Safety measures are taken in case of fire.

Activities

Approach problem by:

- Taking a walk to the nearest fire-alarm box
- Showing a filmstrip
- Reading a story about a fire engine
- Visiting a fire station

Discuss with the children how fires can best be prevented.

Never use or play with matches.

Keep them in a safe place out of reach of very young children.

Help father take the leaves, but do not burn them for him. Let rather handle the matches.

Give old paper and magazines to the school paper drive instead of letting them accumulate in the attic or basement.

Keep oily cleaning rags in cans or keep them washed.

Stress the importance of thoroughly putting out a campfire by using water, dirt or wet leaves.

Make a chart on campfires.

Do not leave a fire.

Put the fire out with: wet leaves
sand
dirt
water

(Grade I - Safety - Fire)

(Activities - continued)

Make a small fire in a pan. Put an asbestos plate under the pan. Extinguish the fire by covering it with sand or dirt. This will prove that fire needs air to make it burn.

Take the group around the building to find safety provisions: fire extinguisher, fire exits, fire bell.

Stress the importance of using a flashlight instead of a candle in a jack-o-lantern.

To culminate activities on the prevention of fires, make an activity booklet by folding a long narrow strip of brown wrapping paper into 8 sections.

Leave one section for the titles and have the children use the other seven to illustrate the rules for preventing fires. Have each child make an activity booklet.

Problem 2: How can we make our fire drills vital?

Discuss with the group the following important rules:

When the fire alarm rings, walk quietly to the nearest exit.

Keep hands at sides and walk quickly, but do not run.

Be alert and ready to listen at all times in case a change in directions is made.

Close the door of the classroom after everyone has left.

Stress the importance of fire drills to each child. Fire drills may keep him from getting hurt in case of a real fire.

Make a chart on fire-drill rules.

Walk - not run.

Do not push.

Do not talk.

Have the children make a border of flames (use red paper) to paste around the edge of the chart.

(Grade I - Safety - Fire)

(Activities - continued)

Have several practice fire drills. Make a mural.

Have each child draw himself walking in a straight line.

Discuss the proper procedure to observe when a child's clothing catches on fire. Pretend to smother the fire with a blanket or coat, or by rolling the child on the floor. Also have the children dramatize this:

Cover a lighted candle with a glass jar. Help the group to realize that the fire of the candle goes out when it has no air.

Discuss what a child should do if he discovers a fire himself. Ask him to notify an older person immediately and request the older person to turn in the alarm or call the fire station. Have the children dramatize this procedure.

Make a simple fire truck out of an egg carton. Use silver buttons for headlight and black buttons for wheels. Paint with red powder paint.

Make a table model of a burning house (flames of red paper), using pipe-cleaner people, an egg carton fire truck, et cetera. Use dramatic play to show the procedure that should be used in asking an adult to turn in an alarm or in smothering a fire in case of burning clothing. Let the children manipulate the pipe-cleaner figures to show all this.

Books To Be Read To The Children

<u>Book</u>	<u>Author</u>	<u>Publisher</u>
<u>Firemen</u>	Hefflefinger and Hoffman	Melmont Publishing Company
<u>Firemen,</u> (Unit Study Book No. 103)	Eleanor Johnson	Educational Printing House, Inc.
<u>Fireman Fred</u>	Jene Barr	Albert Whitman and Company
<u>The Little Fire Engine</u>	Lois Lenski	Oxford University Press
<u>True Book of Policemen and Firemen</u>	Irene Miner	Children's Press

(Grade I - Safety - Fire)

(Activities - continued)

Films

City Fire Fighters, Cr 92 10 minutes

Fire Exit Drill at Our School, Cr 96 10 minutes

The Fireman, 202 10 minutes

Tony Learns About Fire, 532 18 minutes

Filmstrip

The Fireman, Fs-11 (pr., el.) 80 frames

Source for the Children

<u>Source</u>	<u>Author</u>	<u>Editor</u>
Belmont Publishing Company	Belmont and Hoffman	
Encyclopaedia Britannica, Inc.	Encyclopaedia Britannica	
Albert Whitman and Company	John W. Whitman	
Oxford University Press	John W. Whitman	
Children's Press	John W. Whitman	

GRADE ONE

SAFETY

(TRAFFIC)

Problem 1: How to cross the street, ride a bus, car or bicycle safely.

Concepts

We prevent accidents by obeying traffic signs and signals.

It is important to know our full name, address and telephone number, especially if we are ever lost.

We prevent injury by being careful when we ride on the bus, in a car, or on a bicycle.

We cross the street safely by obeying the patrol boys.

Activities

Approach the problem by:

Taking a walk to a nearby intersection where there is a traffic light

Discussing crossing the street safely

Showing a filmstrip

Having a policeman visit the room and talk to the children

Demonstrate how to use traffic signals, and teach what they mean.

Make a table model of several streets surrounding the schools, using pipe-cleaner or clothespin figures for people. Through dramatic play have the children manipulate the figures making them go to and from school.

Make a large traffic light, using three paper plates thumbtacked to a piece of wood. Play a "traffic game" marking the floor with chalk to make streets, and having two or three children bring a wagon or small car from home.

Have a policeman visit the room and talk to the children about safety.

Have patrol boys come to the room to talk about crossing the street safely.

(Grade I - Safety - Traffic)

(Activities - continued)

Take the children outside to watch the patrol boys at work.

Play "Pat Moran," using a play policeman's hat. Have one child wear the policeman's hat and sing the part of Pat Moran, page 19 in The American Singer.

Use poems:

Stop! Look! Listen!
I stop (child halts).
I listen (hand to ear).

I stop and wait
While the red light shows (walk
and stop);
I look (look back, to left, and
right) and walk
While the green light glows (take
a few steps).

It's red on top (make a circle,
hands lifted high)--
Now we stop (mark time, feet in
place)!
It's green below (lift cupped
hands to eye level)--
Look and go (look around and march
forward)!

The Policeman

He stands tall and brave
And looks truly fine;
I like him a lot:
He's a good friend of mine.

The star on his breast
Gleams shiny with light;
He's neat and he's polished
With gold buttons bright.

He says, "Hello, Sis,"
And he ruffles my hair
In his hand big and strong,
But I never do care.

He blows his bright whistle
To tell me to go.
While cars and trucks halt
And wait in a row.

I'm so glad he's around
To protect big and small
Don't you think he deserves
A big "Thanks" from us all?

Make stick puppets to use in dramatizing crossing the street safely. Have children make figures out of cardboard and cut them out. Staple these to popsickle sticks.

During the first week of school, take the children to a corner where they can watch a traffic light. Help them to see that when the red light stops the cars, the green light signals for people to go.

Prepare a chart on the traffic light.

The red light says, "Stop."
The yellow light says, "Wait."
The green light says, "Go."

(Grade I - Safety - Traffic)

(Activities - continued)

Prepare a chart on the policeman.

The policeman is a good friend.

He helps boys and girls.

We must obey his signals.

Plan a safety program to culminate the unit. Invite another room to hear it.

Use this suggested safety check list with the children to find out what they have learned:

What do the different colored traffic lights mean?

Tell how to cross the street safely.

Why should we always go home directly after school?

Should we cross in the middle of the block or only at corners?

Why should we wear something white at night?

Why is it important not to ride with strangers?

These and other questions might be used for a quiz show.

Stress the importance of going right home from school at noon and at 3:30.

Discuss the danger of walking and playing in the street.

Discuss the danger of petting or playing with strange dogs.

Have the children practice telling their names, addresses, and telephone numbers, to be sure that each can tell a policeman where he lives and how to contact his home.

Use poem:

Going and Coming

The streets were made for autos is
a fact you won't deny.

The sidewalk is the place to wait
for autos to go by.

Prepare a chart on our safety rules

Cross at corners.

Look both ways.

Watch for turning cars.

Wear white at night.

Discuss the danger of riding with strangers. Dramatize what might happen.

Stress the importance of riding bicycles, scooters and wagons on the sidewalk.

(Grade I - Safety - Traffic)

(Activities - continued)

Stress the importance of sitting down when riding in a car or bus. (See page 5 in the science text for an experiment which demonstrates this).

Discuss the danger of putting hands, arms or head out of the car or bus window.

Make a chart on a bus ride.

We have fun.

We sit like this.

We wait until the bus stops to get up.

Books To Be Read To The Children

<u>Book</u>	<u>Author</u>	<u>Publisher</u>
<u>Our Health and Safety</u> (Little Wonder Book)	James V. Williams	Charles Merrill Company
<u>Policemen</u> (Unit Study Book)	Eleanor M. Johnson	Educational Printing House
<u>Red Light, Green Light</u>	G. McDonald	Doubleday, Doran Co.
<u>Safety Can Be Fun</u>	Munro Leaf	Lippincott Company
<u>The Little Auto</u>	Lois Lenski	Oxford University Press
<u>The Two Cards</u>	Ingri and Edgar d'Aulaire	Doubleday, Doran Co.
<u>True Book of Policemen and Firemen</u>	Irene Miller	Children's Press

Films

<u>Patty Learns to Stop, Look, and Listen</u>	479	18 minutes
<u>Safety Patrol</u>	303	10 minutes
<u>Safety To and From School</u>	347	10 minutes
<u>Strangers</u>	911 (el.)	10 minutes

Filmstrips

<u>Bike Behavior</u>	Fs-705 Record (pr., el.)	30 frames
<u>On-The-Street Conduct</u>	Fs-623	26 frames

GRADE ONE

SAFETY

(TOYS)

Problem: How to play safely with toys.

Concepts

Safety rules are followed when playing with toys.

Playing with sharp objects is a safety hazard.

Toys should be put away when not in use.

Activities

Approach unit by:

Letting each child bring his favorite toy to school

Encouraging the children to discuss their own favorite toys

Telling the original story of Betsy concerning an accident with a toy.
(See activities below.)

Telling the group about a newspaper account of a recent accident in which a child was seriously hurt while playing with a toy

Discuss with the group the importance of the following rules:

Children should use roller skates, wagons, tricycles, doll buggies, only on sidewalks, in their own yards, or on streets officially closed to traffic. They should also be encouraged to be courteous to other people using the sidewalks.

Roller skates should be removed before children cross a busy street or go up or down stairs.

Children should never carry sharp objects or glass bottles when skating or riding a toy with wheels.

Toys should be put away in a safe and proper place when not in use.

Have the group bring pictures of toys that have wheels and talk about what fun the children have with them. Make a large chart using these pictures and label each picture for reading correlation.

(Grade I - Safety - Toys)

(Activities - continued)

Dramatize safety with roller skates.

Have two little girls skating on the sidewalk. Have them show what to do when they come to an intersection. Have them sit down and take their skates off as they carry on a conversation. Mark the sidewalk with chalk on the floor.

Ask the children to draw a picture of toys put away carefully and another picture of toys left on a stairway.

Song:

Sing - to the tune of "The More We Get Together"

The More We Think of Safety

The more we think of safety,
Of safety, of safety;
The more we think of safety,
The safer we'll be.
Ride safely, walk safely,
Play safely, talk safety.
The more we think of safety
The safer we'll be.

Tell the original story of Betsy:

Betsy was cutting new dresses for her paper dolls when Alice called her to come to see her new puppy. Betsy dropped her scissors and dolls on the floor and hurried out.

A few minutes later Betsy's baby sister, Jane, who was just learning to walk, came into the room and found the pretty shining scissors. She picked them up, but soon fell down and cut her knee on them.

Betsy was glad it was no worse. But she was sorry that her baby sister had been hurt. She said she would never be so careless again.

Stress the importance of these rules through discussion:

We do not run with sharp toys in our hands.
We do not point sharp toys towards anyone.
We do not use darts or arrows unless an adult is present to supervise.
We carry scissors with the points down, and we hand them to another person with the points away from that person.

Dramatize these four rules.

(Grade I - Safety - Toys)

(Activities - continued)

Discuss with the group the great importance of the following rules:

Do not go out into the street after a ball without looking both ways.
Never leave marbles or any toys that roll on the floor or on steps,
because of the danger of other people falling on them.
Keep marbles out of your mouth.

Poem:

My Toys

These toys I take out of a box
And build things with.
They are my blocks.

I have to run with all my might
To start this toy.
It is my kite.

I beat the time rum, tum, tum
Playing on my little drum.

I run so fast I almost fall
When my friends and I play with my ball.

Make a chart: Be Safe

Do not run into the street
after a ball.
Never leave marbles or balls
on the floor or steps.
Do not put marbles in your mouth.

Discuss these important rules for flying kites safely:

Always fly kites in an open field or vacant lot.
Avoid all power lines and telephone wires.
Do not run out into the street after a runaway kite.

Make a chart on flying kites.

Fly kites in a safe place.
Do not fly kites near electric wires.

Make kites out of folded colored paper. Make designs on them.

Have the children make a booklet on safety in flying kites.

(Grade I - Safety - Toys)

(Activities - continued)

Have culmination of the entire unit:

Divide the group into five committees.

Assign each committee to bring in a certain toy. Have each committee tell the children about and dramatize the safe use of the toy. For example: roller skates, marbles, a kite, a ball and a toy truck may be used.

Have the children make safety posters for each of the above problems. The teacher may choose several of these posters for bulletin boards in the room or in the halls.

Prepare a program about the proper use and care of toys and invite another group to hear it.

Reference Materials For Teachers

(Lower Elementary Safety Lessons by Ruth Jewell)

Safety Education (published by the National Safety Council in Chicago)

November, 1956

December, 1956

March, 1957

December, 1957

March, 1958

Filmstrips

Safety At Play

Fs-1028 (pr.)

20 frames

GRADE ONE

SAFETY

(Water)

Problem: Swimming, skating or using water in the home safely.

Concepts

Safety rules must be followed to prevent accidents when swimming, skating or walking on a wet or frozen surface.

Activities

Approach unit by:

Reading The Water That Jack Drank to interest the children in water

Encouraging the children to tell their own experiences regarding swimming.

Playing "The Skaters' Waltz" and having the boys and girls skate to it. (See activities below.)

Discuss with the group these very important rules of safe swimming or boating:

Never swim by yourself. You should always have a buddy who could call for help in case of trouble.

Stay out of deep water unless you are a good swimmer.

Do not take unnecessary chances in the water to "show-off."

Never swim where there is no lifeguard.

Stay seated in a boat. Sit quietly, do not lean over the side of the boat and do not rock the boat.

Make a chart:

Safe Swimming

Always swim with someone.

Stay out of deep water.

Do not swim where there is no lifeguard.

Do not show off in the water.

(Grade I - Safety - Water)

(Activities - continued)

Through discussion, stress the importance of the following rules:

Never skate where the ice is thin.

Do not skate where the water is deep unless the ice has been thoroughly tested by an adult.

Never go skating without your parents' permission, even on a small pond. Tell the group of the drowning of two boys who went skating on a small pond without anyone's knowing they were going. No one even knew where to look for them when they did not come home.

Use poem:

Ice Skating

Ice skating is nice skating,
But here's some advice about ice skating.
Never skate where the ice is thin.
Thin ice will crack and you'll fall right in,
And come up with icicles under your chin
If you skate where the ice is thin.

Print this poem on chart paper and decorate it with figures of ice skaters the children draw and cut out.

Play the record, "The Skaters' Waltz" found in the RCA Victor Album of Rhythmic Activities, Volume 4. Let the children skate in pairs or individually, and dramatize staying away from thin ice.

Discuss with the group these facts:

Water makes a surface slippery.

Everyone should be extremely careful not to slip in the bathtub.

A wet floor is unsafe for walking because it is slippery. Water or any other liquid spilled on the floor should be cleaned up immediately.

It is easy to slip and fall when running if the ground or grass is wet.

The handles of pans should always be turned in to prevent boiling water or another liquid from being spilled from the stove and causing a serious accident.

Icy steps, icy curbs and icy walks are extremely dangerous.

Children should never make icy slides on the sidewalk where other people may come along and fall.

Iceicles hanging from the eaves of the house should be cleared away by an adult, not by little children. Icicles are very sharp and pointed and,

(Grade I - Safety - Water)

(Activities - continued)

therefore, dangerous.

Boys and girls should be unusually careful when walking to and from school in icy weather as motorists may lose control of their cars.

Pour water over a board. Let a child push a shoe over both a dry and wet board to see that he can push the shoe on the wet board more easily than on the dry board.

Use poem:

Naughty Soap Song

Just when I'm ready to
Start on my ears,
That is the time that my
Soap disappears.

It jumps from my fingers and
Slithers and slides
Down to the end of the tub,
Where it hides.

And acts in a most
Disobedient way.
And THAT'S WHY MY SOAP'S
GROWING THINNER EACH DAY.

by Dorothy Aldis

Have the children draw someone cleaning up spilled water from the floor, or themselves being careful in the bathtub.

Books To be Read To The Children

Safety Education - Published by the National Safety Council in Chicago.

January, 1957
February, 1957
May, 1957
January, 1958

The Water That Jack Drank, W. Scott - William R. Scott, Publisher.

Films

Swimming for Beginners (el.)	390	10 minutes
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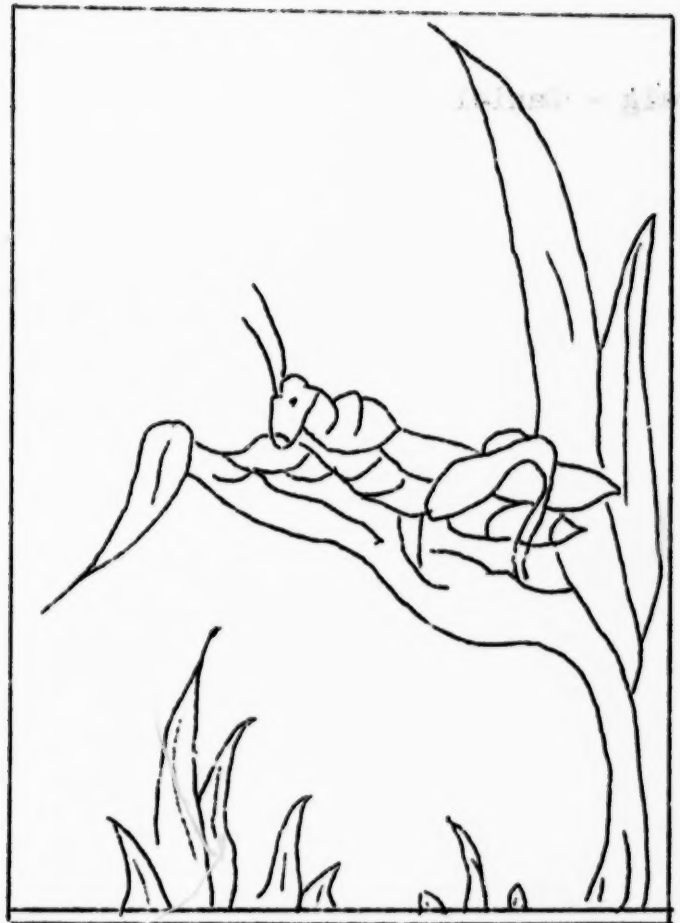
(Grade I - Safety - Water)

Science Equipment

Balloon
Basin to put water in and sail boat and blow waves
Bits of cloth for picture of wind
Calendar (large)
Candle
Clothes sprinkler
A cotton shirt
Flashlight or lamp
Heavy cord or carpet yarn
A leather shoe
Little sail boat
Matches and permission to light them
Paper to make pin wheels
Paper to shred and blow
Pictures of different weather and seasons
A rubber or plastic cap or boot
3 socks
Thermometer
Umbrella
Waxpaper

GRADE TWO

AUTUMN IS HERE



GRADE TWO

AUTUMN IS HERE

TEXT BOOK REFERENCES

Schneider, H. and N.

Science For Here And Now

p. 29 - 42, 89 - 100, 131 - 148

Teachers' Guide

p. 28 - 35, 58 - 64, 84 - 92

Thurber

Exploring Science II

Teachers' Edition

p. 4 - 18, 33 - 48

Craig - Daniel

Science Around You

p. 12 - 23

AUTUMN IS HERE

Concepts To Be Developed

1. Living in Ohio we enjoy the changes in the four seasons of the year.
Ohio is beautiful in the autumn.
2. All living things get ready for winter.
Living things must adapt themselves to seasonal changes.
3. Weather is rapidly changing.
We receive less heat and light from the sun than we did in the summer.
Days are shorter and cooler.
Nights are longer.
4. Plants change.
Fruits and nuts ripen and are ready to fall from the trees.
Seeds scatter.
There are leaf buds on many trees.
Leaves change color and fall from the trees.
5. Animals change in appearance and their activities.
Autumn is moving time for some animals.
Some animals hibernate.
Some animals store food.
6. Man prepares for winter, too.
We wear warmer clothes.
We preserve food for winter by canning, freezing and drying.
We get our heating systems in readiness for protection from winter's cold and snow.
7. Thanksgiving is the day set aside to thank God for the blessings of a good harvest.
8. Men are interdependent in acquiring their food.

Approaches To Unit

1. Read Go With The Sun by Miriam Schlein.
Follow by class discussion.
2. Hold school garden exhibit.
3. Show film - Ohio Beautiful.
4. Show filmstrip - In The Autumn
(Through The Season's Series), Young America Films, Inc.

(Grade II - Autumn Is Here)

(Approaches to Unit - continued)

5. Make use of children's interest in bringing the outdoors into the classroom. Children like to gather the pretty autumn leaves, pick some pretty flowers and bring in the buckeyes, acorns and other seeds.

Problem 1: What signs of autumn are about?

Suggestive Activities

1. Make use of children's interest in bringing into the classroom some of their "discoveries" from week-end trips in the country (leaves, flowers, insects and fruit).
2. Make a science corner with a bulletin board and display table, to exhibit the children's discoveries.
3. Enjoy this poem together if a child brings a yellow maple leaf to class.

In September

I walked down the lane
Past the maple tree,
And Postman Wind
Brought a note to me -
A small yellow note
From my friend the tree!

You call it a "leaf"
Just drifting down?
Why, it says, "Uncle Autumn
Will soon be in town!"
So it's really a letter
The tree sent down!

- Eleanor Hammond

4. Take a nature walk.

Have children list:

Things We Want to See

Things We Want to Know

Have children make their own "Courtesy Hints" for their trip. It is good to take along guide books, an insect net, a jar and magazine to press pretty leaves they may collect.

5. Have children list the signs of autumn as they observe them. Appoint them special detectives of autumn.

Autumn Gossip

Birds are migrating
to the sunny southland.

The autumn leaves
are gold and red.

Caterpillars are spinning
their cocoons.

Days are getting shorter.

We are back at school again.

Decorate chart with children's crayon prints
of leaves.

Problem 2: What do plants do in autumn?

Suggestive Activities

1. Autumn is "Harvest Time."

Plan A Flower Show with the School Garden Exhibit.

Give children a demonstration and some suggestions for making flower arrangements.

Some interesting classifications:

A Mixed Bouquet

A Miniature Bouquet

- An artistic arrangement made in a small container, such as perfume bottle or doll dishes.

Animal Fantasy

- Flower Arrangement in an animal container.

(Grade II - Autumn Is Here)

(Activities - continued)

Wild Flowers

- An arrangement of goldenrod, sunflowers, Queen Anne's lace, dock, cat tails, corn tassels, et cetera.

Zoo Parade

- Animals and birds made from fruits and vegetables.



head)
) - squash
body)

legs - carrots

Flower Specimens

Vegetable Specimens

Fruit Specimens

2. Have children learn to identify ten flowers, ten vegetables and ten fruits.
3. Make an exhibit of edible vegetables and classify them as to the part of the plant we eat.

FRUIT	ROOT	LEAVES	STEMS	SEEDS
Tomatoes Peppers Cucumbers Squash	Carrots Beets Radishes Parsnips	Lettuce Cabbage Spinach Parsley	Celery Broccoli Asparagus Rhubarb	Corn Peas Beans

4. Learn the trees from leaf prints.
Gather as many different leaves as possible. Have children use guide books to identify them. See how many different kinds of maples they can find - how many kinds of oaks. Find the tree with three different shaped leaves on it. What is it? - (The sassafras tree.)

(Grade II - Autumn Is Here)

(Activities - continued)

5. Make leaf prints.

Crayon Prints

Place leaf on a table with vein side up. Cover leaf with a piece of plain paper. Rub over surface with different colored crayons. An exact picture of the leaf with its veins will appear on the paper. Be sure to use flat side of the crayon. Cut leaf out and mount on colored sheet of paper.

Spatter Prints

Place a leaf that has been pressed on a sheet of paper. Dip a toothbrush in some poster paint and rub it back and forth across a piece of screen that is held a few inches above the leaf. Be sure paint is not too thick and do not have too much paint on the brush. When paint is dry, remove leaf and label the print.

6. Make a survey of the school yard to see what kinds of trees grow there.
7. Develop through observation and discussion

How Seeds Travel

Some seeds travel by air.

Some seeds have parachutes; others have wings.
Some are shot out of pods into the air.

Dandelion seeds have parachutes.
Maple seeds have wings.

Some seeds travel by land.

Some seeds stick to animals and people. They are
"hitch hikers" (burdock seeds).

Squirrels carry nuts.
Some grass seeds crawl.

Some seeds travel by water.

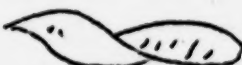
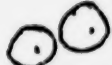
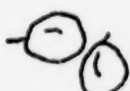
Coconuts often drop into the ocean and travel to new places.

Make a seed exhibit.
Classify them according to the way seeds travel.

(Grade II - Autumn Is Here)

(Activities - continued)

8. Make chart using the following poem and illustrate with seeds. Seeds can be glued on.

<u>SEEDS</u>		
	Seeds are funny, funny things.	
	Some have stickers,	
	Some have wings,	
	Some are big	
	And some are small,	
	Some, round and flat,	
	Some, like a ball.	
	Some are hidden inside of fruits	
	Some in pods,	
	Or underground roots.	
	Some seeds are foods,	
	And good to eat -	
	Like corn and beans	
	Or nuts for a treat.	
	But whatever the kind	
	Or wherever it's found -	
	Most plants grow	
	From a seed in the ground.	
- <u>The Instructor</u>		

(Grade II - Autumn Is Here)

Problem 3: What some animals do in the fall?

Suggestive Activities

1. Write and illustrate a book entitled:
"How Animals Prepare For Winter"

This book may be divided into three parts.

The Sleepers

The Toad
The Frog
The Turtle
The Woodchuck
The Bears

Fur-Coat Growers

Fox
Squirrel
Chipmunk
Dogs
Cats

Animals Who Change Their Address

Birds that migrate
Mountain sheep
Goats
Butterflies
Earthworm (goes deeper into the ground)

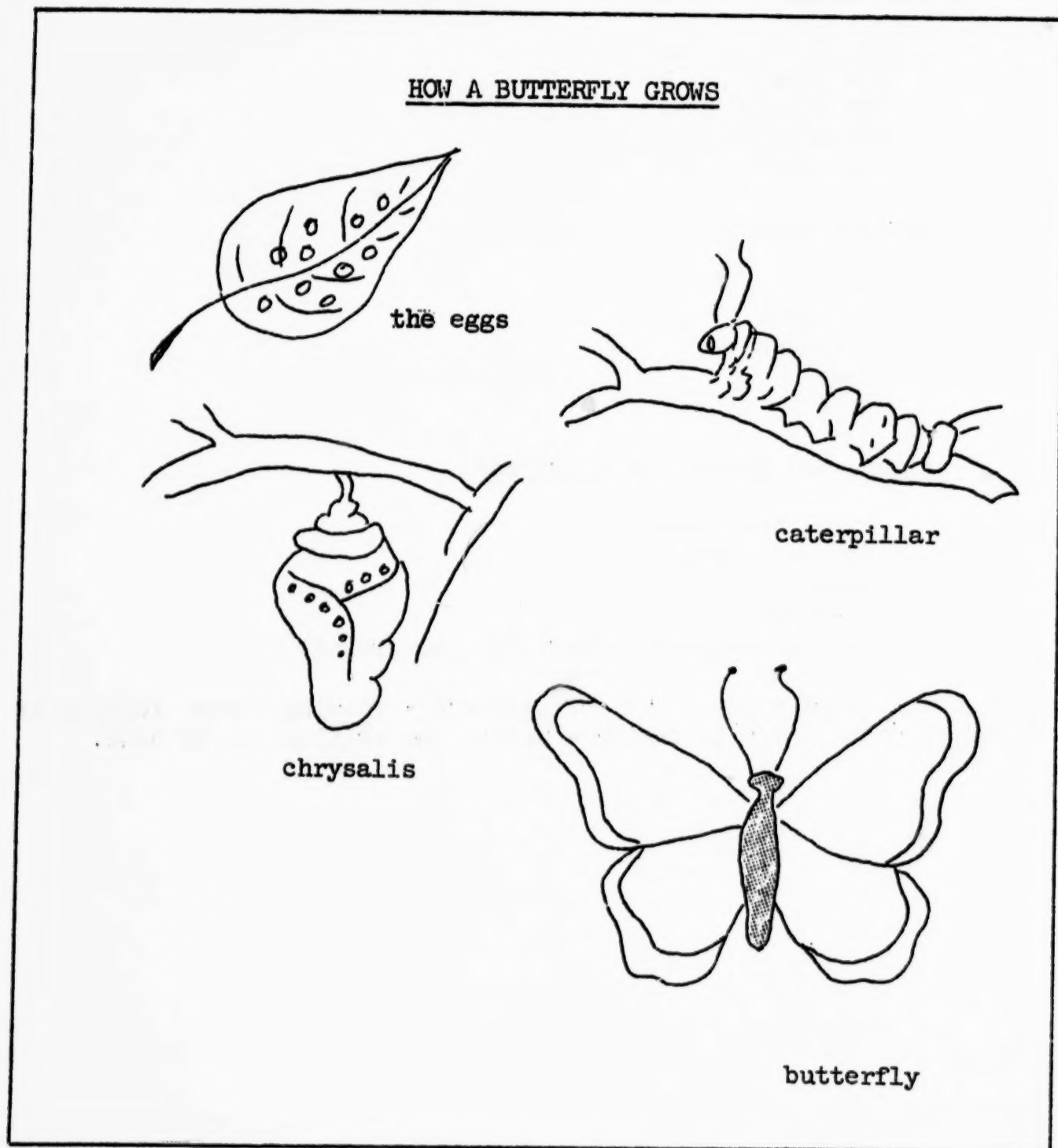
This will take a great deal of research - reading books, looking at pictures, films and film strips - before the writing can be done.

(Grade II - Autumn Is Here)

(Activities - continued)

2. Make charts showing the life cycle of:

- a moth
- a butterfly
- a toad
- a frog



(Grade II - Autumn Is Here)

(Activities - continued)

3. Make a home in your terrarium for a turtle.
Watch what he does when the days get colder.
4. Collect caterpillars in jars and watch them spin their cocoons.
5. Study the grasshopper.

Read about the grasshopper in:

Animals and Their Young

- Glenn Blough

Row-Peterson and Company

Can you answer the questions on page 18 in Exploring Science, II -
Thurber?

6. Watch the birds!

They are gathering in flocks.
They are trying their wings.

Problem 4: What are the weather changes in the autumn?

Suggestive Activities

1. Things to Talk About

Who is Jack Frost?

Does he really paint the leaves?

There is no such person! In the autumn we often say that Jack Frost was here when we see frost on the garden, on the house tops and the lawns.

Where does frost come from?

It comes from air that is very cold.

What is frost made of?

It is made of tiny ice crystals made from the water in the air.
In the summer we call it dew.

Why does frost disappear?

The sun melts the frost and it evaporates. It goes back into the air.
We say it went back where it came from.

(Grade II - Autumn Is Here)

(Activities - continued)

2. Let's Experiment

Can you prove it?

Water Goes Into The Air and Out Again.

Look for a puddle on a rainy day. Check on it often.
At first, it is big and wide.
Then it begins to get smaller.
Finally it dries up.

Where did the water go?

It went back where it came from.
We say the water evaporated.
The water went back into the air.

What happens to the water when you wash the blackboard?

What happens to the water when you leave a dish with water in it on the table?

Water comes out of the air when it rains or snows.

Where does the water come from?

Water comes out of the air.

What is dew?

Fill a metal cup with ice. The drops of water that formed on the outside of the cup give the children a better understanding of how stones, cold earth, grass and other cold objects caused the air that touched it to be chilled and the water vapor in the air to be condensed to form dew.

What is frost?

Fill a metal cup with crushed ice; add some salt and water to fill the cup. The outside will soon be covered with frost. Adding salt brings the temperature of the mixture below the freezing point of water. When the vapor from the air condenses on the very cold cup, frost is formed instead of dew.

What is fog?

Put ice cubes in a jar of hot water.
Watch what happens.

(Grade II - Autumn Is Here)

(Activities - continued)

3. Thing To Do

Keep a record of the temperature every day.

September	20,	1958
Today is		
It is a day.		
<u>Temperature</u>		
A.M.		
P.M.		

Cards to be inserted in chart:

Months

Date

Days of Week

Kind of day - cloudy, cold, sunny, warm

Temperature

Make the record on a large sheet of oak tag. Cut slits in the oak tag where cards are to be inserted.

4. Something to learn:

Little Jack Frost

Boys - Little Jack Frost went up the hill,
Watching the stars and the moon so still,

Girls - Watching the stars and moon so bright
And laughing aloud with all his might.

(Grade II - Autumn Is Here)

(Activities - continued)

Boys - Little Jack Frost ran down the hill,
Late in the night when the winds were still,

Girls - Late in the night when the leaves fell down,
Red and yellow and faded brown.

All - Little Jack Frost walked through the trees,

Boys - "Oh!" sighed the flowers, "we freeze, we
freeze."

Girls - "Oh!" sigh the grasses, "we die, we die."

All - Said Little Jack Frost, "Goodbye, goodbye."

- Unknown

Problem 5: What do we do in the autumn?

Suggestive Activities

1. Things To Talk About

"Autumn is Harvest Time"

Food

Farmers bring their fruits and vegetables to market.
Mother makes jelly, cans peaches and puts things in the freezer.

At home

We take down the screens.
Daddy gets the heating system in good order.
We wear warmer clothing.
Mother brings some plants indoors.

2. Things To Do

Take a trip to the Farmer's Market. See how he brings produce to
the city and sells it to the grocers and restaurant owners.

Make Apple Jelly

Make Dioramas showing:

The Farmer's Market
Clothing We Wear in Autumn

SOURCE MATERIALS

Bibliography for Teacher

1. Blough, Glenn: The Insect Parade, Row-Peterson and Company, Evanston, Illinois.
- * 2. Coffey and Minton: A Leader's Guide to Nature and Garden Fun, Hearthside Press, Inc., New York 16, New York, 1957.
3. Meyer, Jerome S.: Picture Book of the Weather, Lothrop, Lee and Shepard, Inc., New York, New York, 1948.
4. Parker, Bertha Morris: Six-Legged Neighbors, Row-Peterson Company, Evanston, Illinois.
5. ____: Leaves, Row-Peterson Company, Evanston, Illinois.
6. ____: Insect Friends and Enemies, Row-Peterson Company, Evanston, Illinois.
7. ____: Seeds and Seed Travels, Row-Peterson Company, Evanston, Illinois.
8. Webber, Irma: Bits That Grow Big, E. M. Hale and Company, Eau Claire, Wisconsin, 1949.

* Good suggestions for Conservation, Flower Arranging and Bird Lore.

Children's Bibliography

1. Gottlieb, William: The Four Seasons, Simon and Schuster, New York City, 1957.
2. LeWitt, Jan: The Vegetabull, Harcourt Brace and Company, Chicago, Illinois.
3. Podendorf, Illa: True Book of Insects, Children's Press, Inc., 1954.
4. ____: True Book of Seasons, Children's Press, Inc., 1955.
5. Shannon, Terry: Come Summer, Come Winter, Albert Whitman and Company, Chicago, Illinois, 1956.
6. Schlein, Miriam: Go With The Sun, William R. Scott, Inc., New York City, 1942. (Very good.)
7. Tresselt, Alvin: Autumn Harvest, Lathrop, Lee and Shepherd, New York City, 1951.

(Grade II - Autumn Is Here)

(Source Materials - continued)

8. Webber, Irma: Travelers All, William R. Scott Company, 1944.
9. ____: Anywhere In The World, William R. Scott Company, 1947.

Supplementary Textbooks

Parker, Bertha Morris: Fall Is Here, Row-Peterson and Company, Evanston, Illinois. (Easy reading.)

Audio-Visual Aids

Films:

A Day At The Fair - 52'

Autumn On The Farm - 490 (Changes in plant and animal life during autumn)

Monarch Butterfly

Ohio Beautiful - 159

Ohio State Fair - 274

Seasons of The Year - CR 117

Film Strips:

In The Autumn (Through-the-Seasons Series, Young America Films, Inc.)

(Grade II - Autumn Is Here)

EVALUATION SHEET

I. Unit

II. Placement

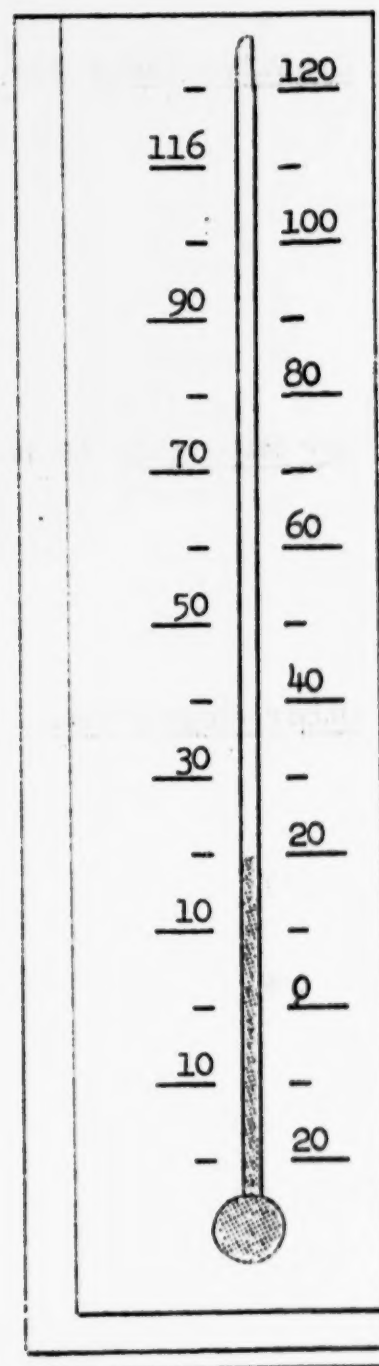
III. Creative Ideas you have found helpful

IV. New Materials to make unit more meaningful

V. Other Suggestions

GRADE TWO

WINTER IS HERE



GRADE TWO

WINTER IS HERE

TEXTBOOK REFERENCES

Craig - Daniel

Science Around You
Teachers' Edition
p. 64 - 79

Schneider, H. and N.

Science For Here and Now
p. 81 - 122
Teachers' Guide
p. 65 - 78

Thurber

Exploring Science
Teachers' Edition
p. 33 - 48

WINTER IS HERE

Concepts To Be Developed

1. Winter is a resting time.
Gardens and fields rest.
Seeds are asleep under the snow.
Even plants in the warmer climates go through a dormant season.
2. Some animals are awake.
Some animals are asleep; they are hibernating.
Some need our care in order to live.
3. Northern winters are cold.
Southern winters are not as cold as northern winters.
The farther north one goes in our country the shorter the winter days are.
Winter days are shorter than summer days.
4. Snow is useful to man and plants.
Sometimes it is dangerous.
5. Man must learn to adapt himself to a change in living - his home, his clothes, food and recreation.

Approaches to the Unit

1. Talk about the first snowfall.
2. Use film strip
In The Winter (Through-the-Seasons Series, Young America Films, Inc.)
3. Talk about the changes that all living things make when winter is here.
Have children list "Things We Want To Know About Winter."
4. Take a trip into the neighborhood to observe changes in plant life, and how people dress.
5. Observe temperature changes.

Problem 1: What are the signs of winter?

Suggestive Activities

1. Observation and Discovery

After a discussion on what seasonal changes children have noticed, make a chart of their observations as:

(Grade II - Winter Is Here)

(Activities - continued)

WINTER IS HERE.

I KNOW!

1. Snow covers the ground.
2. Days are colder and longer.
3. Ground is frozen.
4. Temperatures are lower.
5. Some animals hibernate.
6. Some animals have new fur coats.
7. We wear heavier clothes.
8. We play in the snow.
9. We are kind to our feathered friends.

Problem 2: What is snow? What is this fluffy white substance gently falling from the sky?

Suggestive Activities

1. Take the children outside.
Provide each child with a magnifying glass. Have children run about in the falling snow and catch snowflakes on the sleeves of their coats and inspect them through the magnifying glass.

Let them discover:

- Snowflakes are different shapes.
- No two are alike.
- Most snowflakes have six points.

2. Have children enjoy cutting snowflake designs from folded paper.

1. Fold large circle in half.



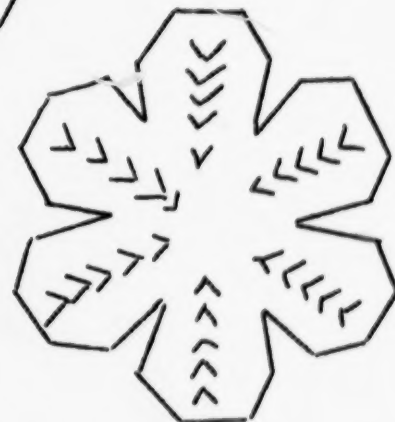
2. Fold again into thirds. Now you have a cone.



3. Then fold once more.



4. Cut design on edge opposite final fold.



(Grade II - Winter Is Here)

(Activities - continued)

3. Bring a dish full of snow into the classroom to find out what snow is made of.
Lead children to discover that when snow melts, it turns into water.
Can the children change the water back to snow by taking it outside again?
No, in freezing temperatures it will change to ice.
What then is snow?
Snow is the moisture in the air which solidifies (or becomes solid) without first becoming liquid, (raindrop).
4. Perform these experiments:

Water Has Three Forms. What Are They?

Procedure

- a. Melt some ice.
Water will form.
Water is a liquid.
- b. Freeze some water.
At what temperature will water freeze?
Ice is a solid.
Ice is heavy.
- c. Boil some water.
Steam will form.
Steam is a gas.

Do snow and ice take up more or less room than water?

Procedure

Place a jar filled with snow in a warm room.
What happens?
What will happen to the jar of melted snow when we put it outside?
The snow and ice take up more space than the water.

Problem 3: What do animals do in winter?

Suggestive Activities

1. Who's asleep?

- the turtle sleeps.
- the frog and toads, deep in mud, are in their winter sleep.
- the bear sleeps in caves.
- bats sleep in caves.
- skunks use a hollow log or use the burrow of some animal.

2. Who's awake?

- the squirrel scampers about eating nuts he has stored.
- fish keep active near the bottom of the lake.
- deer search for food in the snow-covered woods.
- winter birds.

3. How do some animals protect themselves in winter?

The animals that stay awake wear a heavier coat, and some, like the weasel, wear a coat of white instead of brown.

The snow rabbit changes the color of his coat. White is the color of the snow. This helps these animals to protect themselves.

4. Teach poem, then illustrate it.

Winter Sleepers

Where do you think the woodfolk go
When winter comes with cold and snow?
Like people, all of these contrive
In various ways to keep alive.
Most birds, and beasts like elk, migrate,
While many others hibernate.

In a far chamber tunneled deep
Below the frost line, woodchucks sleep.
The bear, fat as a butterball,
Asleep will need no food at all.
When black bear wakes in springtime, she
May bring out a young family.

In burrows, well placed underground,
Chipmunk and ground squirrel too are found.
They wake to eat their winter hoard
Of nuts and seeds that they have stored.

(Grade II - Winter Is Here)

(Activities - continued)

Raccoon lives in a hollow tree;
A big and heavy fellow, he
Curls in a ball and hides his nose,
Using his tail for warm bedclothes.
Covered with ice in mud and slime
Of ponds, frogs pass the wintertime.

- by Maude Wood Henry

5. A suggestion for science bulletin board

Children may illustrate it or go to library picture file for pictures.

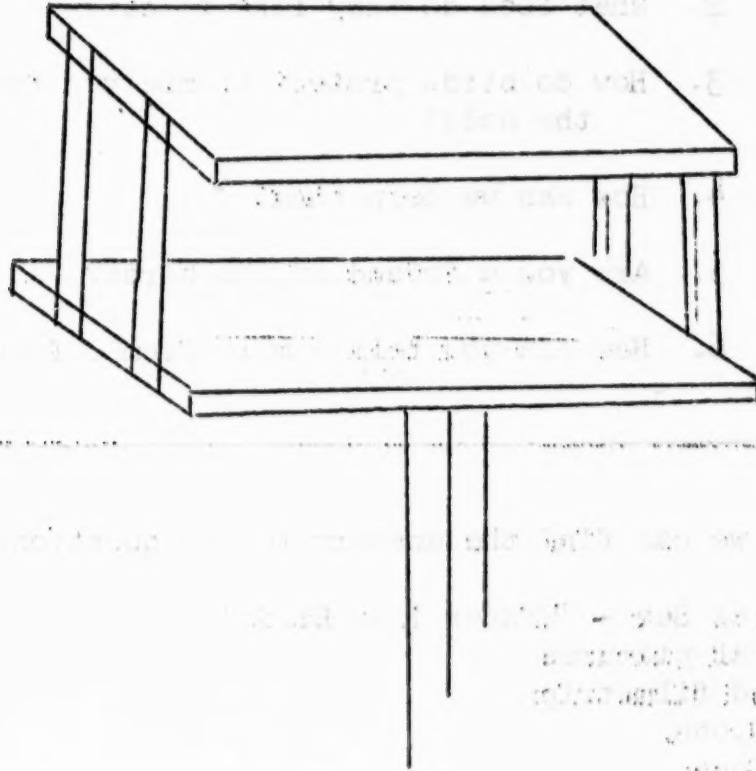
Bear	Turtle	Toad
Bee	<u>W I N T E R</u> <u>S L E E P E R S</u> Who are they?	Worm
Groundhog		Moth
Skunk	Frog	Bat

(Grade II - Winter Is Here)

Problem 4. How can we help our feathered friends?

Suggestive Activities

1. Now is the time to set up feeding stations and get acquainted with our winter birds. When snow covers the ground, seeds and insects are scarce.



2. Enjoy this poem:

The Birds In Winter

All the seeds are hidden away
Underneath the snow;
I'll remember every day
Many crumbs to throw;
Then the birds that chirp,
"Tweet - tweet"
Will have something good to eat.

(Grade II - Winter Is Here)

(Activities - continued)

3. Make a chart:

Can You Tell?

1. Who are our winter residents?
2. What food do they like to eat?
3. How do birds protect themselves from the cold?
4. How can we help them?
5. Are you a friend of the birds?
6. How can you tell a male from a female bird?

4. Discuss how we can find the answers to our questions.

1. Reading as See - "Winter Tree Birds"
2. Looking at pictures
3. Films and filmstrips
4. Observations
5. Discussions

5. Use this project for bulletin board.

As children study each bird, have them write a story and illustrate it.

(Grade II - Winter Is Here)

(Activities - continued)

picture story Nuthatch	picture story Cardinal	Chickadee
Sparrow	OUR WINTER RESIDENTS	Bluejay
Junco	Tit-mouse	Downy Woodpecker

(Grade II - Winter Is Here)

Problem 5: What is good about snow?
What is bad about snow?

Suggestive Activities

1. Make a report card for snow and illustrate it with pictures from the news.

S N O W

Good

Snow is beautiful.
We ride over the snow.
We make snow men.
We play games.
We make a snow fort.
We go coasting.
Makes a blanket for plants
in the ground.
It keeps the young tender plants
from freezing.

Bad

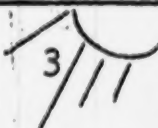
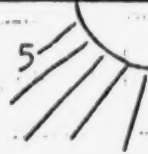
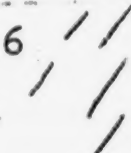
Snow makes trouble.
It stops our cars.
We have to clean it off our walks.
It blocks traffic.
It is difficult for birds to find food.
It makes work for snow plows and work crews.
It makes driving hazardous.
It grounds air travel.
It hampers telephone lines.

(Grade II - Winter Is Here)

Problem 6: What kind of weather do we have in winter?

Suggestive Activities

1. Keep a weather calendar.

J A N U A R Y						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
				1 	2 	3 
4 	5 	6 	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

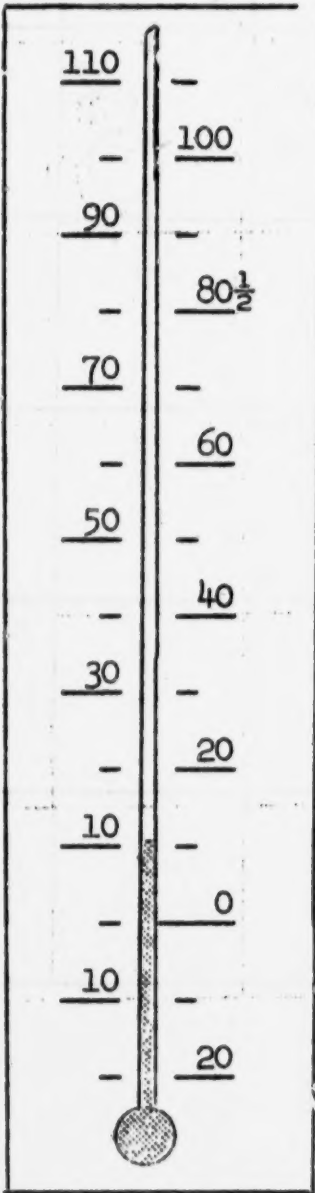
2. Keep a record of the number of:

- the sunny days
- the cloudy days
- snowy days
- rainy days

(Grade II - Winter Is Here)

(Activities - continued)

3. Chart the daily outdoor temperature in the morning and afternoon on a large chart for your school. Place chart on a bulletin board in the hall. Temperature is recorded by red ribbon moved up on the chart. The red ribbon represents the mercury in the tube.

WEATHER REPORT	
	Wednesday,
	January 12, 1959
	snowy
	TEMPERATURE
	A. M. 8°
P. M. 10°	

Make cards for:

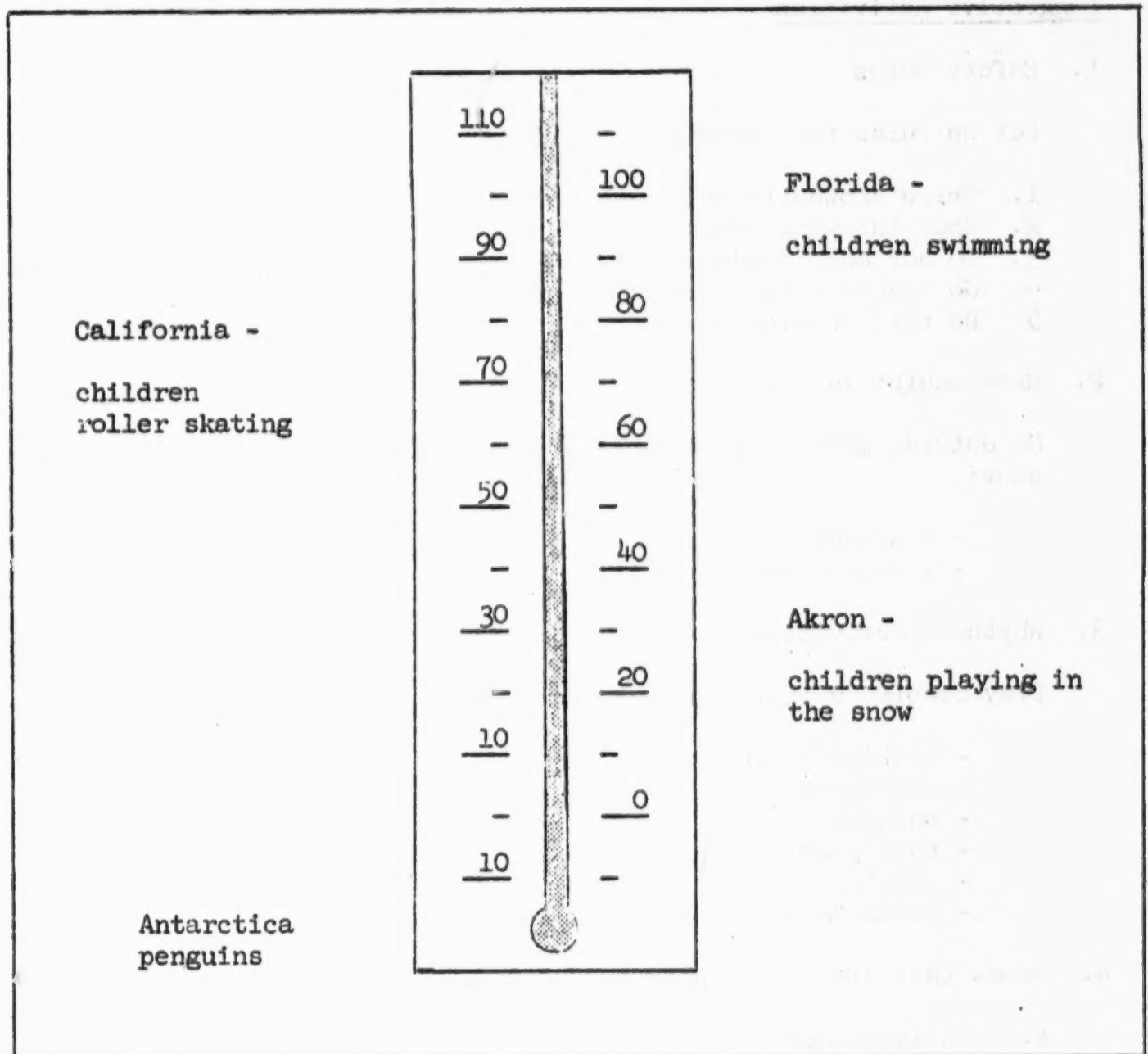
- | | |
|---------------------|---|
| a. Months | c. Temperature records |
| b. Days of the week | d. Illustrated cards for rainy, cloudy, snowy and sunny |

(Grade II - Winter Is Here)

Problem 7: Is Winter cold everywhere?

Suggestive Activities

1. Make a large thermometer on a wide length of wrapping paper. Have children illustrate activities of children living where temperatures are different from ours.



2. Listen to weather news over the television or radio as recorded in:

Akron
Elsewhere in Ohio
California
Florida
Frazier, Colorado

(Grade II - Winter Is Here)

(Activities-continued)

3. Have children bring weather news from the newspaper.
4. Check the Akron temperature by thermometer outside the classroom window.

Problem 8: What winter fun can we have?

Suggestive Activities

1. Safety Rules

Set up rules for "Safety in the Snow"

1. Throw snowballs only in snowball territory.
2. When throwing snowballs aim below the belt.
3. Do not make slides on walks. Someone may fall and injure themselves.
4. Go coasting in places free of traffic or pedestrians.
5. Be sure skating is reported safe by recreation authorities.

2. Snow sculpture class

Go outside after a good packing snow and see what we can model with the snow:

- a snowman
- a dog, a cat, et cetera

3. Rhythmic activities

Play record "Winter Fun" - Young People's Records, Inc.

- walking in the snow
- shoveling
- snowball
- snow plow
- skating
- swimming and floating in the south

4. Games that are fun to play in the snow.

- a. Fox and Geese
- b. Angels - lying in snow and moving arms up and down for wings
- c. Snow forts

5. Sleigh ride

If there is plenty of snow, plan an old-fashioned sleigh ride for family fun.

Problem 9: What do plants do in winter?

Trees and plants rest from their summer growing.

(Grade II - Winter Is Here)

Suggestive Activities

1. Read poem.

Trees are funny,
Do you know why?
They change their clothes
The same as you and I.
They're green in summer,
Red in fall
But when it's cold
They wear none at all.

2. Make a discovery.

Look at trees on the playground. Bring in a few branches of a fruit or buckeye tree and some forsythia branches. Examine these under a magnifying glass and look for the little winter buds. Open up a few to see what is inside. The other branches put in warm water. Crush stems. Watch to see the buds swell and open.

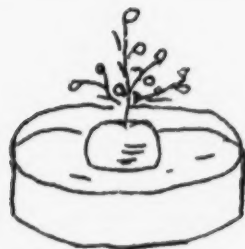
3. Plant some narcissus bulbs.
(Plan to share these with some shut-in for valentine.)

4. Cut one bulb in half, lengthwise.
Have children look for the plant inside the bulb.
Use a magnifying glass.

Make a chart:

Can You Find?

- a. The plant in the bulb
 - b. Food for the plant
 - c. Roots
 - d. Leaves
 - e. Protective covering
5. Indoor Winter Gardens

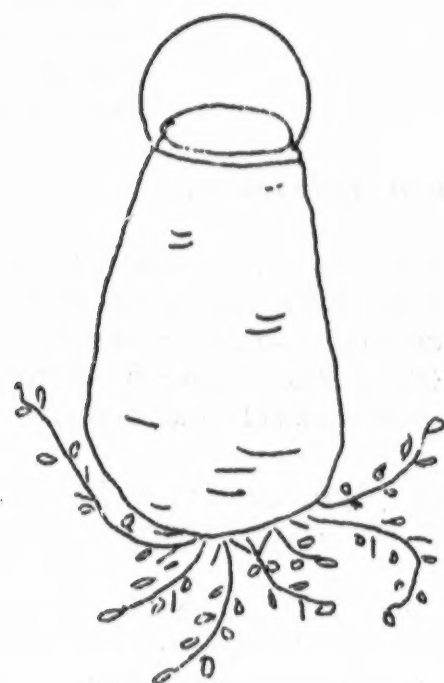


Cut carrot in half and place top
in dish of water. Watch sprouts
come out.

(Grade II - Winter Is Here)

(Activities - continued)

Carrot cut in half with core removed makes a hanging basket. Fill with water and hang near a window.



A sweet potato makes a pretty vine. Place in a jar of water. Support with tooth picks. Green shoots will soon sprout from the potato's eyes.



(Grade II - Winter Is Here)

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1. Adelson, Leone: All Ready for Winter, Junior Literary Guild and David McKey Company, New York City, 1952.
2. Hader, Berta and Elmer: The Big Snow, Macmillan Company, Chicago.
3. Ozone, Lucy and Hawkinson, John: Winter Tree Birds, Albert Whitman and Company, Chicago, Illinois, 1956. (Very good.)
4. Selsam, Millicent: A Time For Sleep (How the Animals Rest), William R. Scott, New York City, 1953.
5. Shannon, Terry: Come Summer, Come Winter, Albert Whitman and Company, Chicago, Illinois, 1956.
6. Tresselt, Alvin: White Snow, Bright Snow, Lothrop, Lee and Shepard, Inc., New York City, 1947.

Supplementary Textbooks

Parker, Bertha Morris: Winter Is Here, Row-Peterson and Company, Evanston, Illinois, 1950. (Easy reading - Excellent pictures).

Visual Aids

In The Winter - Film Strip, Young America Films, Inc., (Through-The-Seasons Series)

Winter On The Farm - Film - #508

Music

Record - Winter Fun, Young People's Records, Inc., New York City.

(Grade II - Winter Is Here)

EVALUATION SHEET

I. Unit

II. Placement

III. Creative Ideas you have found helpful

IV. New Materials to make unit more meaningful

V. Other Suggestions

GRADE TWO

SPRING IS HERE

"Come the spring with all its splendor,
All its birds and all its blossoms,
All its flowers, and leaves, and grasses"

- Longfellow



GRADE TWO

SPRING IS HERE

TEXTBOOK REFERENCES

Craig-Daniels

Science Around You
pp. 90-109, 122-126, 132-143

Schneider, H. and N.

Science For Here and Now
pp. 164-180, 181-194

Thurber

Exploring Science
pp. 33-48, 103-116, 145-172

SPRING IS HERE

Concepts To Be Developed

1. Spring is "Wake-Up Time."

Animals are coming out of hibernation.

Birds are migrating back to the northland.

2. Spring is growing time.

Plants push down roots and push up stems with blossoms and leaves.

3. Days are longer and warmer.

The temperature is climbing up and up. We have more sunny days.

4. Farmers plow their fields and plant seeds.

People work in their gardens.

5. Babies are everywhere!

Baby squirrels
and little birdlings
Tadpoles, piglets,
cubs and ducklings.

Approaches to Unit

1. Have children check the weather on the first day of March.

Did March come in like a lion or a lamb?

2. Show the film-strip: "In The Spring"
(Through-the-Season's Series)
Young America Films, Inc.

(Grade II - Spring Is Here)

(Approaches - continued)

3. Enjoy the poem:

Proof Positive

The North Wind with his voice so shrill
Insists that it is winter still;
But no matter how he raves
Or how badly he behaves,
I just know
It isn't so,
Yesterday I spied a robin
Through the orchard trees a-bobbin'!
And crocuses are blooming
in the snow.

- Alice Crowell Hoffman

Problem 1: What are some signs of spring?

Suggestive Activities

1. Make a spring bulletin-board recording and illustrating the signs of spring that the children have observed.

		
First Robin	Easter Bunny	Skunk Cabbage

2. Have the children be special detectives of spring. On the way to and from school have them observe new signs of spring and report to the class for "Show and Tell" time in the morning. Give special commendation to those who show a particular keenness of observation.

(Activities - continued)

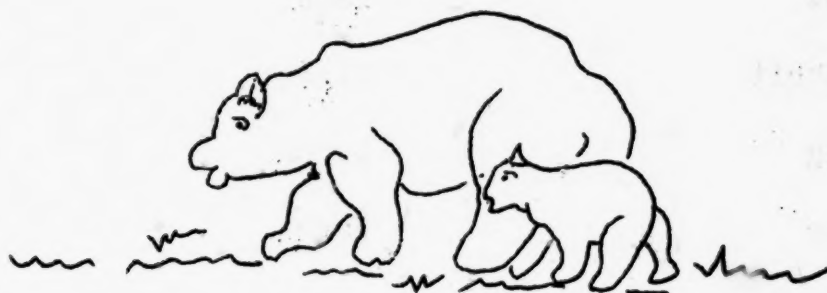
(Activities - continued)

3. Force some spring flowers and flowering shrubs.
Flower buds are fully formed on the stems of trees and shrubs in the fall after the growing season ends. After seasoning by frost and cold weather, the buds are ready to flower as soon as warmth and moisture start sap flowing into them.
4. Look for skunk cabbage.
It is one of the first spring flowers. Its little cap, shaped like the hat of a little elf, often pushes up through the snow.
5. Watch the sky at night.
Where is the Big Dipper now?
Discover how the Big Dipper points to the North Star.

Problem 2: What do animals do when spring is here?

Suggestive Activities

1. Watch for the wondrous change!
The ugly caterpillar that spun a silken blanket about itself last fall may emerge now any day a beautiful Cecropia moth. If it is a female, she will lay many little eggs.
2. Spring is the time for babies.



3. All during the spring there are baby animals. Mother bear comes out of her cave with her cubs.
Frogs are laying eggs in ponds. Frog eggs are in masses of jelly.
Toads lay their eggs, too. Toad eggs are in long ribbons of jelly.
Birds are building their nests.
Moths are coming out of their cocoons.
Baby squirrels are now in the nests high up in the trees.
4. Look for pictures of animals and their young.
Be able to name at least ten of them.

(Grade II - Spring Is Here)

(Activities - continued)

5. Read 'Animals and Their Young, Glenn Blough, Row-Peterson and Company.
6. Make a chart, or make ditto copies of the game "Mother and Babies."

Match mother and baby:

Bear	Duckling
Horse	Tadpole
Duck	Chick
Hen	Cub
Toad	Colt
Bird	Birdling
Dog	Kitten
Cat	Puppy
Sheep	Calf
Cow	Lamb
Rabbit	Piglet
Pig	Bunny
Doe	Fawn

7. Take a bird walk some morning. Listen to the bird's chorus. Can you tell which is our state bird's call?
8. Play records of bird songs. Play the records over and over until you can easily tell these songs. It is fun to be able to say "Mr. Cardinal is about. I hear him call."
9. Take an old robin's nest. Examine it to see what it is made of.
- 10.

S. O. S.

(Grade II - Spring Is Here)

(Activities - continued)

Help the birds build their nests. Gather bits of yarn, string, short lengths of unraveled pieces of hemp rope. Place these bits on shrubs and fences for the birds to gather in their nest making.

11. Discuss care of Easter pets.

1. Do you pick up a rabbit by its ears? NO! Support its weight. Pick it up by the loose skin about the shoulder, putting your hand underneath it to support its weight.
2. What does it like to eat? Rabbits need some green food every day, but any root vegetables, such as carrots, beets or turnips are good for them. In addition, they need sweet hay and grain.
3. How should you care for little chicks?
Feed them a mixture of balanced chick feed.
Keep them in a warm place.
Give them water to drink.
4. Why does it peep-peep so much?
It is lonesome.
It may be cold.
It may be thirsty.
It may be hungry.
5. What special handling should we give chicks and ducklings?
Don't pick them up unless it is necessary.
Enjoy them as they run about their play area.

If you do not have a good home for your pet, give it to someone who lives out where there is a big yard and a house for it to live in.

Problem 3: What do plants do?

Suggestive Activities

1. Watch the outdoors get green.
Watch the grass, especially after an April shower.
2. Play the game "I Spy."
See who is the first to bring to class a spring plant.

(Grade II - Spring Is Here)

(Activities - continued)

I SPY		
<u>Plant</u>	<u>Date</u>	<u>By Whom</u>
Pussy Willow	March 1	Jennifer
Swelling Buds	March 5	Sherri
Maple Sap		
Crocus		
Forsythia		
Daffodil		
Tulip		
Violet		

3. Choose a tree in the school yard.
Observe it the beginning of each school week.
Keep a diary of its development.

4. Discover how plants grow.

Make an exhibit for science table.

(Grade II - Spring Is Here)

(Activities - continued)

NEW PLANTS

Where do they come from? How do they start?

1. Seed

A radish grows from a seed.

2. Tuber

Potato plants grow from the "eyes" in potatoes. Each eye is a bud. The bud starts a new plant.

3. Bulb

Daffodils grow from bulbs.
Onions grow from bulbs.

4. A runner

A strawberry plant sends out a runner.
A new plant grows on it and sends its roots into the ground.

5. Cutting

A stem can start a new plant. Put a piece of ivy in water. Roots will grow! You can plant the ivy. Use cuttings of ivy, pussy-willow or begonias.

6. A leaf

A leaf of African violet may start a new plant.
Plant in pot of good soil and water.

(Grade II - Spring Is Here)

Problem 4: What is in the heart of a seed?

Suggestive Activities

1. Enjoy poem:

The Little Plant

- Kate L. Brown

In the heart of a seed
Buried deep, so deep.
A dear little plant
Lay fast asleep.

"Wake," said the sunshine
"And creep to the light."
"Wake," said the voice
Of the raindrops bright.

The little bulb heard
And it rose to see,
What the wonderful world
Outside might be.

2. Let's experiment.

Sprouting Seeds

Line a small pan with wet cotton. Then place on the cotton lima beans. Cover the lima beans with a layer of wet cotton or wet paper towels.

Within a day or two have children check to see what is in the seeds. As they cut apart the bean they will see:

- the little plant in the seed
- food for the plant

A Germinating Box

Put squash or radish seeds between layers of glass and blotting paper. The panes of glass are then tied and placed in pan of water.

Children will enjoy watching the roots turn and go downward and the shoots go upward.

Problem 5: What are the parts of a plant?

Suggestive Activities

(Grade II - Spring Is Here)

(Activities - continued)

Things to do:

1. Choose something to talk about -
Our bodies have many parts.
What are they?
How do they help us?

Plants have parts.
What are they?

2. Make a discovery.

Pull up a plant from the ground. Have the children look for the parts and discover how they can help the plant.

Roots

- a. Hold the plant in the soil.
- b. Get water and food for the plant from the soil.

Stems

- a. Helps to hold the leaves up.
- b. Carries water from roots through the stem to the leaves.

Leaves

Make food for the plant.

Flowers of Blossoms

Make seeds for new plants.

Seeds

A seed is made up of a tiny plant. Food for the new plant and a coat for its protection.

3. Experiment to show plants drink water.

Take a glass of water. Add a little red ink to the water. Put a piece of celery in the glass. Watch the red water go up the stem after several hours.

Get a carrot. Put it in a glass of water with a little red ink. Keep the carrot in the water for several hours. Then cut the carrot across the top. Look for the red dots. Cut the rest of the carrot the long way. See the red lines. The dots and the lines show where the red water came up through the carrot.

(Grade II - Spring Is Here)

Problem 6: What do plants need to grow?

Suggestive Activities

Things to do:

1. Do plants need the sun?

Take two potted plants alike in kind and size. Put one in the window and the other in a dark cupboard. Give them both water. Compare the two after a week or two.

2. Do plants need water?

Take two potted plants alike in kind and size. Put them both in the window. Water one every day. Do not water the other plant. Compare the two in a week or two.

3. Do plants need air?

Take two potted plants alike in kind and size. Put them in the window. Water them every day. Cover the soil around the one plant with wax paper. Cover the plant with a glass jar. Compare the two in a week or two.

4. Do plants need good soil?

Take two plants alike in kind and size. Plant one in good soil. Plant the other in sand. Put both plants in the window. Water the plants every day. Compare the two in a week or two.

Problem 7: What changes are there in the weather?

Suggestive Activities

1. Keep a weather record.

Make a chart for the daily weather report. Have the children take turns being Mr. Weatherman and record the outdoor temperature, clouds, the wind and the sunshine. This should be done at the same time each day. It can be done in the morning and again in the afternoon.

2. Make dioramas showing the clothing we wear with the change in weather.

- a. Playing outside on a bright sunny day
- b. An April shower

3. Follow the sun.

Every morning at a certain time mark where the sunlight shines at a given place in the classroom. Begin with the first day of spring and continue to mark the place daily.

(Grade II - Spring Is Here)

(Activities - continued)

4. Study the water cycle.

Sea to cloud to earth to sea.

SOURCE MATERIALS

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Francoise: Springtime for Jeanne-Marie, Scribner's, New York City, 1955.

Horwick, Frances-Werrenrath, R.: Growing Things, Rand-McNally & Co., Chicago, 1954.

Tressett, Alvin: Hi, Mister Robin!, Lothrop, Lee and Shepard Company, Inc., New York City, 1955.

Tressett, Alvin: Rain Drops Splash, Lothrop, Lee and Shepard Company, Inc., New York City, 1954.

Supplementary Textbooks

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Blough, Glenn: Plants 'Round The Year, Row-Peterson and Company, Evanston, Illinois. (Book may be a little difficult, but good reference material for gifted to make a report.)

Parkes, Bertha M.: Spring Is Here, Row-Peterson and Company, Evanston, Illinois. (Easy reading and good pictures.)

Audio Visual Aids

Film Strips:

In The Spring

(Through-The-Seasons Series)
Young America Films, Inc.

(Grade II - Spring Is Here)

(Audio Visual Aids - continued)

Toads Grow (Growing-Things Series)
The Jam Handy Organization.

Films:

Adventures of Bunny Rabbit	218
Calendar, The	Coronet Films
Frog, The (Complete life cycle)	210
Gardening	412 - 11
Gray Squirrel	199
Red Hen (Red Hen slips away and hides a nest under some bushes. The duck discovers her secret. The eggs hatch and the Red Hen cares for her babies.)	419
Robin Redbreast (Story of a robin family)	133
Spring On The Farm (Blossoming trees, robin's nest, pussywillows, baby animals, et cetera.)	491
What Makes Day and Night	423
What Makes Rain	289

(Grade II - Spring Is Here)

EVALUATION SHEET

I. Unit

II. Placement

III. Creative Ideas you have found helpful

IV. New Materials to make unit more meaningful

V. Other Suggestions

GRADE THREE

Unit - Rocks, Clay, Minerals, Salts

O B J E C T I V E S

The purpose of this unit is to develop an understanding of the importance and place of rocks in the composition of the earth's surface, and the different kinds to be found.

Problem 1: Where is rock found?

Concepts

Rocks contain minerals

Everywhere under land and sea there is solid rock

Soil covers most of the rock of the earth. It contains bits of rock and crumbled plants.

Activities

Put some soil into a jar. Let it stand for a while. Pour off the water and soil which didn't sink. Feel the stones in the soil in the bottom of the jar.

Texts

Science Far and Near,
p. 2-3.

Science Far and Near,
p. 4-6; 18-20.

Problem 2: How is soil formed from rock?

Concepts

The heat of sunlight expands and cracks rock.

Activities

Observe how cracks are build in sidewalks to allow for expansion. Explain how heat causes things to become larger. Help children to understand how, when the sun heats rocks, they break because the outside of the rocks does not have room to expand in all directions.

Texts

Science Far and Near,
p. 7-10.

(Grade III - Rocks, Clay, Minerals, Salts)

Concepts

Activities

Texts

Running water carries along grains of sand and bits of pebbles and stones that scratch and cut at rocks.

Show a picture of a water falls. Niagara Falls is a good example. Discuss how the stones, sand and other materials carried in flowing water wears away the rock - the faster the flow of water, the greater the erosion of rocks.

Science Far and Near,
p. 11-13.

When water freezes in a crack in a rock, it makes the rock split and crumble.

Fill an ice-cube tray with water. Let it freeze and then observe that the ice is heaped higher than the top of the tray. Frozen water expands.

Science Far and Near,
p. 14-16.

Sand carried by wind scratches and wears away rock.

Discuss how the wind carries dust and sand. Describe how rough sand feels. Rub a piece of sandpaper over a rock. Observe how long it takes to wear away the rock.

Science Far and Near,
p. 17.

Some plants soften and crumble rocks.

If possible, find a piece of rock with lichens growing on it, or a picture of such a rock. Explain that lichens are flat grayish-green or grayish-blue plants which look somewhat like moss.

Science Far and Near,
p. 18-19.

Teacher's Manual,
p. 25.

Discuss how some plants grow on rocks by making soil out of the rocks. Also talk about how plants become part of the soil when their leaves fall and when plants die.

Rocks vary as to their hardness, softness, smoothness and roughness.

Make a collection of different kinds of rocks. Classify them as to hardness and softness. A soft rock will not scratch a harder rock.

Science Far and Near,
p. 40-43.

Observe buildings made of stone. Discuss how Indians used hard stones for weapons and to break soft stone.

(Grade III - Rocks, Clay, Minerals, Salts)

Concepts

Sandstone is made of sand grains pressed and cemented together under the sea.

Activities

Crush a piece of sandstone to show that it is formed from grains of sand. Take a handful of wet sand and squeeze it into a ball in order to show how wet sand sticks together. In the sea water there are materials that help sand stick together, become hard and make sandstone.

Texts

Science Far and Near,
p. 44-45.

Problem 3: Where do we find clay?

Concepts

Clay comes from the materials in certain kinds of rocks.

Activities

Let children feel and work with clay.

Text

Science Far and Near,
p. 55.

This material has been carried and deposited into clay beds which are scattered rather generally over our entire country.

Teacher's Manual,
p. 36.

Problem 4: How does water affect clay?

Concept

Water softens clay.

Activity

Put a piece of dry clay in water. Let it stay for a while. Notice then how cloudy the water becomes and how soft and crumbly the clay is.

Text

Science Far and Near,
p. 48-49.

Problem 5: How does heat affect clay?

Concept

Heat hardens clay.

Activity

Drop pieces of broken dishes, flower pots into water. Notice that the water does not become cloudy. Explain how clay is heated in kilns to harden and strengthen it.

Text

Science Far and Near,
p. 50-51.

(Grade III - Rocks, Clay, Minerals, Salts)

Concept

Activity

Text

Note: The study of clay may be extended to its use in making dishes, bricks, tile and other clay products.

Science Far and Near,
p. 52-53.

Problem 6: Why is clay of different colors?

Concept

Text

Clay comes from rocks of different colors.

Science Far and Near,
p. 55.

Problem 7: What are minerals?

Concept

Text

A mineral is a substance of the earth that is neither plant nor animal material. A rock is composed of one or more minerals. Rivers and streams carry dissolved minerals into the ocean.

Science Far and Near,
p. 105.

Salt is a mineral, found in some rocks, which will dissolve in water.

Place some salt in one jar and sand in another. Add water and show that salt will dissolve in water. Note that sand will not. Taste the water from the jar to which the salt has been added. You can taste salt, but you cannot see it.

Science Far and Near,
p. 105.

Note: The study of salt as a mineral may be extended to the study of the ocean finding why ocean water is salty and its relationship to the water cycle.

Problem 8: What is limestone?

Concepts

Activity

Text

Limestone is made in the sea partly from the shells and bones of sea animals. Limestone contains a large amount of the mineral called calcium.

Make a collection of sea shells. Observe buildings of limestone.

Science Far and Near,
p. 124.

Science Far and Near,
p. 124.

(Grade III - Rocks, Clay, Minerals, Salts)

Note: For a further study of calcium and its importance in building strong teeth and bones, refer to unit on health.

BIBLIOGRAPHY

Children's Press: The True Book of Rocks and Minerals.

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Schneider, Herman and Nina: Rocks, Rivers and the Changing Earth.

GRADE THREE

Unit - Living Things In Lakes and Streams

OBJECTIVES

The purpose of this unit is to help children become aware of the various plants and animals which make their homes in lakes and streams, and to develop an understanding of how these plants and animals make lakes and streams their home.

Problem 1: What are lakes and streams?

Concepts

A lake is a body of standing water surrounded by land -- bigger than a pond. A stream is a steady flowing of water over ground -- a small river.

Activities

Show slides: Life in Ponds, any dictionary, Lakes and Streams, Gs98. Discuss the lakes and streams in the community. Talk about the fun you can have on a vacation near a lake or a stream. Tell how lake water is different from ocean water. Make a list of the plants and animals that you would find at a lake or stream.

Texts

THE FISH

Problem 2: How does a fish breathe?

Concepts

All animals need air, even fish. A fish can separate the air from water by means of gills.

Activities

Make an aquarium (See Science Far and Near, p. 172-174). Show film-strip: Keeping an aquarium, Gs102.

Texts

Science Far and Near, p. 163.

(Grade III - Living Things In Lakes and Streams)

Concepts

The gills are a series of plates that can filter out oxygen dissolved in water.

Activities

Observe the animals which live in the water. Watch a fish to see the movement of the mouth and the gill covers. Experiment with a glass of water to show air in water. (See Science Far and Near, p. 163.) Put a pan of water on a stove and heat. As it gets warm you can see bubbles in the water. More heat makes the bubbles come to the top and burst. Air is in the bubbles.

Texts

Walt Disney: Secrets of Life, p. 102.

When fish lie quietly they need less air. That is why they can live in ice-covered lakes.

By using exertion, find out if it makes one breathe slowly or quickly.

Science Far and Near, p. 164.

Find out why water does not freeze throughout a lake.

Herbert: Mr. Wizard's Science Secrets, p. 216-219.

Problem 3: How does a fish control movement?

Concepts

A fish is built with a strong tail for swimming. The fins are used for steadiness and for stopping.

Activities

Observe the movement of the tail and fins. Experiment with two large sheets of cardboard to see how a fish uses fins for stopping (See Science Far and Near, p. 166.)

Text

Science Far and Near, p. 165-166.

Problem 4: What body covering does a fish have?

Concept

This fish is covered with scales which overlap, making it easy for him to slip through the water.

Text

Science Far and Near, p. 167.

(Grade III - Living Things In Lakes and Streams)

Problem 5: What is interesting about the Stickleback?

Concepts

The busy male fish, like a bird, builds a nest of twigs, grass or whatever he can carry in his mouth. He lures a mate by performing for her. He dances, zigzags, stands on his tail, turns and swims rapidly to the nest and she follows. After she lays eggs, he chases her away for she will eat the eggs. He brings air to the eggs by causing a bubbly current with his fins and tail. When the babies hatch, they pop to the surface, attracted by the light. The overworked father catches them in his mouth and spits them back into the nest until they are big enough to fight off enemies on their own.

Text

Walt Disney:
Secrets of Life,
p. 110-111.

THE FROG

Problem 1: How does the frog have protection?

Concepts

A fish looking up from underneath a frog cannot see him easily because his body on the underside is almost white. A bird flying overhead cannot tell if there is a frog on a lily pad.

Activities

Experiment with a sheet of dark paper and a sheet of light paper. Hold them both against the sky to find out which is hardest to see.

Texts

Science Far and Near,
p. 168-169.

Problem 2: Why is the frog found at a lake?

Concepts

The frog eggs are laid in water where they hatch. The baby frog swims around in the water while he is a tadpole. Then legs develop

Activities

Make a picture chart of the life story of a frog, beginning with the egg. Collect some eggs to watch them hatch and change as

Texts

Science Everywhere,
p. 154.

(Grade III - Living Things In Lakes and Streams)

Concepts

and he has to hop up on land, but he never goes far away from the water.

Activities

they grow.

Show the sound film:
"The Frog," 210.

Texts

Science Everywhere,
p. 154.

Problem 3: How is the frog like the toad?

Concepts

In the spring the toad comes and sits in the water and sings by puffing out his throat. Then in the water the mother lays eggs encased in strings of clear jelly. After a time these eggs change into tadpoles.

Activities

A little tadpole has no eyes and no mouth when first out of the egg, but it has gills and a sticky part which helps it hang on things. As it grows it changes in many ways. Skin grows over gills, eyes form, and the mouth opens. It begins to eat the living plants and animals in the water. When about two months old, it begins to look like a toad. First, the front legs come out, then the hind legs and bulging eyes. All this while it gradually loses its tail.

Find out what happens to the tail of a frog or a toad.

Texts

Exploring Science - 3,
p. 160-163.

Exploring Science - 3,
p. 164-169.

Frogs and toads are somewhat alike.

Exploring Science - 3,
p. 170.

Problem 4: What do frogs do in winter?

Concepts

Frogs hibernate down in the mud near the water. They dig holes to have air stored for their long

Activities

Texts

Frazier, Dolman, and
Van Noy: The Seasons
Pass - Grade 3,
p. 41-42.

(Grade III - Living Things In Lakes and Streams)

Concepts

sleep. They need very little air when they hibernate.

Activities

Texts

THE INSECT

Problem 1: What is an insect?

Concepts

A tiny animal with six legs, three parts to his body and born from an egg is an insect. Some swim, some jump, some fly and some crawl.

Activities

Make a picture chart of insects. Make a display of real insects.

Texts

Science Far and Near,
p. 171.

Problem 2: Why do we find so many insects at a lake?

Concepts

Insects find plenty of food around a lake. They like to eat other insects, insect eggs, the juicy leaves and plants.

Activities

Show slides: "Small Fresh-Water Animals and Insects." Gs 99.

Texts

Science Far and Near,
p. 170.

The surface of the water is a thin film and tiny insects called mites run over this surface film.

Go on a class trip to find some insects that live in your neighborhood. Find out which insects are harmful to health, (See unit on Health and Safety) or harmful to clothes, or harmful to us personally. Find out how the pests may be exterminated. Look up the meaning of: larva, pupa and chrysalis. Check to see how many wings a fly has and how many a butterfly has.

Walt Disney: Secrets of Life, p. 101.

Problem 3: What is interesting about the dragon fly?

(Grade III - Living Things In Lakes and Streams)

Concepts

A dragon fly looks like a toy airplane. It uses its big wings to help it get food and to fly away from danger. Its thin body keeps it from being seen easily.

Activities

Texts

Science Everywhere,
p. 25.

It is the insect king of the air. Its wings are spread-even after landing. By whirring, it darts, swoops and stands still in mid-air. In an earlier stage of its life it is a dragon fly nymph. At this time it has no wings and cannot swim. It is an ugly, fat, dark-brown beetle, an inch long. It walks clumsily at the bottom of the lake with its terrible appetite, eating everything smaller than it is. When it is ready to live in the upper world, it crawls out on a twig and dries off in the sunshine. Then its skin splits down the back. It steps out clinging to the old skin for about an hour and then it flies off to explore the new world.

Problem 4: What is interesting about the diving spider?

Concepts

The diving spider spends most of its time under water. It does this by grabbing a bubble of air from the surface and hugging it to his chest against its breathing tubes. When the bubble gets stale, it goes back to the surface for a fresh bubble. Delicious food for the spider is found under the water. It is also a good place to hide

Activities

Texts

Walt Disney: Secrets of Life, p. 105-107.

(Grade III - Living Things In Lakes and Streams)

Concepts

Activities

Texts

from enemies so it stores up air by building a home of splash bubbles at the bottom of the lake and does not come up at all. Eggs are placed in a cocoon to bob on top of the water soaking up sunshine until they hatch. New babies dive back to the bubble home until they are big enough to build their own home.

THE SNAIL

Problem 1: What is a snail like and of what value is it?

Concepts

A snail is a small one-footed animal in a shell, usually spiral. It crawls along very slowly.

Activities

Observe the movements of a snail and study the snail eggs. (See Heath - Grade 3 p. 176-177.)

Texts

Any dictionary.

He keeps the aquarium clean. Too many plants would cause the water to become cloudy and green. His job is the same in a lake.

Science Far and Near,
p. 177.

WATER BIRDS

Problem 1: How does a water bird use its bill?

Concepts

A duck's bill is like a strainer. It scoops up mouthfuls of food from the bottom of the lake and strains out the mud, retaining only the food.

Activities

Make a picture chart, showing birds with different kinds of bills.

Texts

Science Far and Near,
p. 180-181.

A duck tips upside down in the water to eat plants that grow under the water.

Science Everywhere,
p. 34.

Some birds have bills like soup ladles for scooping up small fish.

Science Far and Near,
p. 181.

A pelican eats fish. Sometimes it flies high to look for fish. Then it dives down into the water and scoops up

Science Everywhere,
p. 35.

(Grade III - Living Things In Lakes and Streams)

Concepts

Activities

Texts

a fish. Other times it stays close to the surface of the water and as it goes along it scoops up a fish.

Other birds have strong bills which act like a pair of pliers -- some even with sharp ridges. Some birds have sharp pointed beaks for digging into weeds for seeds.

Science Far and Near,
p. 181.

Problem 2: What is interesting about the feet of water birds?

Concepts

Activities

Texts

Many birds have webfeet which are good for swimming and walking in soft mud. Some have sharp claws which are good for grabbing a fish. Some have long legs so that they can wade in shallow water.

Science Far and Near,
p. 182-183.

Long-legged birds like to eat frogs.

Exploring Science - 3,
p. 184.

Problem 3: How do water birds protect their bodies from the water?

Concepts

Activities

Texts

Water birds have a way of oiling their feathers which keeps them from getting wet.

Science Far and Near,
p. 184.

THE BEAVER

Problem 1: Can you describe a beaver?

Concepts

Activities

Texts

A beaver is a soft furry animal with a broad flat tail and web-feet. He is a very good swimmer.

Any dictionary.

Problem 2: How is the beaver a hard worker?

(Grade III - Living Things In Lakes and Streams)

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
The beaver has four strong front teeth for carrying on his work.	Show sound film: "Beaver," 132	<u>Exploring Science - 3,</u> p. 69.
He cuts down trees with his sharp teeth. He uses the trees to build dams and a home. When danger arises, he uses his broad tail to slap the water to warn the little beavers to run home.	See unit on Health and Safety. Find out what a beaver home is called.	<u>Science Far and Near,</u> p. 185.
It is in the autumn that the beaver cuts down trees, then cuts the trees into shorter pieces which he drags to the water and piles and fastens down with mud. In winter the bark from these logs will be the beaver's food.	Find out how the beaver is useful to us.	<u>Exploring Science - 3,</u> p. 88.

THE TURTLE

Problem: What is interesting about a turtle?

<u>Concept</u>	<u>Activity</u>	<u>Text</u>
Turtles like to eat the worms that fishermen use when they go fishing.	Show filmstrip: "Fresh Water Turtles and Fish" Gsl01	<u>Science Everywhere,</u> p. 15.

PLANTS

Problem 1: How can plants grow down in the water?

<u>Concepts</u>	<u>Activities</u>	<u>Text</u>
Their flexible stems help them to take the movement of the water. The leaves of a water plant are held up by the water. Water plants have only little roots or no roots. They absorb water through every part of them.	Observe how the stems of water plants bend easily. Remove a plant from the water to see what happens to the leaves when it is taken from the water. Check the roots of a water plant. Compare with other plants.	<u>Science Far and Near,</u> p. 178.

(Grade III - Living Things In Lakes and Streams)

Problem 2: What happens to the seeds of the water plants?

Concepts

Seeds often fall in the water. Streams may carry them for miles. Some float to land. Water lily seeds sink to the muddy bottom.

Some of the plants that grow will float on top of the water. Others will root in the wet soil at the bottom and push long stems up through the water.

Activity

Find out how plants help fish and other plants.

Texts

Exploring Science - 3,
p. 23.

Science Everywhere,
p. 153.

Problem 3: Are there some plants and animals in the water that you cannot see?

Activity

Make many interesting discoveries by bringing in samples of water from lakes, ponds, and streams. Observe under a microscope.

Text

Science Everywhere,
p. 8.

THE MIRROR

When I look into a glass
Myself's my only care,
But I look into a pool
For all the wonders there.

When I look into a glass
I see a fool;
But I see a wise man
When I look into a pool.

- William H. Davies

GRADE THREE

Unit - Food and Clothing

It is recommended that the material in this unit be assigned in the following order:

Unit

Food and Clothing

FOOD

Problem 1: Where does our food come from?

Concepts

Man needs many plants for food. People raise gardens and have farms. Some farmers raise sheep and cattle.

Food comes from farms.

Food comes from gardens, farms and forests. Planting is an industry for some people and a recreation for others. Some food is obtained by hunting animals.

Problem 2: What makes food spoil?

Concepts

Milk is a single plant. It lacks chlorophyll. It lives upon roots and other organic things. Milk needs moisture in order to thrive.

GRADE THREE

Unit - Food and Clothing

O B J E C T I V E

It is recommended that the material in this unit be supplementary to the social-studies units in these subjects.

FOODS

Problem 1: Where does man obtain his food?

Concepts

Man uses many plants for food. People plant gardens and have farms. Some farmers raise sheep and cattle.

Food comes from trees.

Food comes from oceans, lakes and streams. Fishing is an industry to some people and a recreation to others. Some food is obtained by hunting animals.

Activities

Make a chart of the seven basic foods. Discuss which are gathered from plants and which are obtained from animals. Draw a mural showing different types of farms. Collect pictures of fruit trees and their fruits. Write a story about maple sugar.

Make a chart of foods that contain large amounts of minerals. Make pictures of different methods of fishing.

Make a diorama of early man hunting for wild animals.

Texts

Heath - Science Far and Near.

MacMillan - Health Secrets, p. 77-127.

Heath - Science Far and Near, p. 189.

Heath - Science Far and Near, p. 131, 162.

Heath - Science Far and Near, p. 126-129.

Ginn - Science Everywhere, p. 39-45.

Problem 2: What makes food spoil?

Concepts

Mold is a simple plant. It lacks chlorophyll. It lives upon bread and other organic things. Mold needs moisture in order to thrive.

Activities

Have children experiment with mold. Discuss how heat and air cause spoilage. List the various causes of spoilage.

Texts

Ginn - Science For The Elementary School Teacher, p. 470-472.

(Grade III - Food and Clothing)

Problem 3: What is the science of food preservation?

Concepts

Activities

Texts

Food needs to be preserved in order that it may not be wasted. Years ago man saw the need for food to be preserved. Sometimes he had too much food; at other times he starved. Food is preserved in the home. Factories preserve food.

Have teams of two or three children demonstrate various ways of preserving food.

Heath - Science Far and Near, p. 149-161.

Salting preserves food.

Some foods can be preserved by drying.

Ginn - Science for the Elementary School Teaching, p. 377.

Cooking is a common way of preserving. Stewing, boiling, hot-and cold-pack methods are used.

Smoking foods preserves and adds a special flavor to fish and cheese.

Freezing foods is a popular method of preserving today.

Bring to school a small box in which food is stored in a freezer.

Food to be frozen must be fresh.

Food to be frozen must be clean.

Frozen foods may be bought at stores.

Learn about the duties of health officers in providing for safe food.

CLOTHING

Problem 1: What materials are used for clothing?

Concepts

Activities

Texts

Prehistoric man used furs for clothing.

Make a fur chart.
(See, Science Near and Far, p. 98.)

Heath - Science Near and Far, p. 75.

(Grade III - Food and Clothing)

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Pioneers made cloth from flax or sheep's wool.	Make a collection of various materials used for clothes. Classify them.	Heath - <u>Science Far and Near</u> , p. 89-91.
People learned to use cotton and silk.	Experiment with fibers.	Heath - <u>Science Far and Near</u> , p. 78.
Man has learned to make cloth from various materials: hair, cocoons, wood and other plants, milk, sand, coal and salt.	Experiment with milk and vinegar.	Heath - <u>Science Far and Near</u> , p. 96.
People used science to help them make better cloth.		

Problem 2: What determines the type of clothes people wear?

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Climate and weather require different types of clothing.	Experiment to discover the warm and cool qualities of wool and cotton.	Ginn - <u>Your Town and Mine</u> , p. 8-15.
People want to be comfortable and attractive.	Let one group make a collection of the best dress styles for the four seasons in our community.	Laidlaw - <u>Easy Steps to Health</u> , III, p. 97.

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GRADE THREE

Unit - Simple Machines

OBJECTIVES

In this unit children will develop the understanding that a machine is something which helps make our work easier. They will become acquainted with five simple machines: the wheel, lever, wedge, ramp and pulley, and find that they form the basis of most of the mechanical contrivances in the world. They will examine and experiment with various tools and objects to discover how these machines are employed.

Problem 1: What is a machine?

Concepts

Activities

Texts

A machine is something that does work or makes work easier.

Before the class attempts to answer the question, have them name many machines and tell why each one is used. Make lists of machines their mothers use, their fathers use and they themselves use.

Science Far and Near.

Machines aren't always large and complicated. Some are quite small and simple.

Display some simple machines such as a nut-cracker, claw hammer, can opener, pliers, scissors and ice pick. When they have been examined, ask the class, "Are these tools machines?" If they are, they must make work easier. Have each tool demonstrated by a child showing how it makes work easier. Show a chart on which are displayed pictures of the simple machines taken up in this unit: levers, wheels, pulleys, inclined planes (ramps)

(Grade III - Simple Machines)

Concepts

Activities

Texts

and wedges. Ask the children to name something these machines do.

Problem 2: What makes a machine work?

Concepts

Activities

Texts

A force has to be used to make a machine work.

Machines alone cannot do work. To make machines help us, we need something that will make them work. What is this something called? Have the children recall what makes their toys or tools work.

Some forces that make machines work are wind, water, steam, electricity and strong muscles.

As the class names different forces required for machines to do work, list them on the chalkboard. Below each force listed, write the name of some machine that uses it.

Problem 3: Why must we be careful when we use machines?

Concepts

Activities

Texts

By using machinery and tools carefully, accidents are avoided.

The discussion of this question should be a safety lesson.

A section of the bulletin board could be devoted to clippings about accidents caused by machines. The clippings should be brought in by the children. Make posters, stressing careful use of machines and tools.

Science Far and Near.

Problem 4: How could a boy lift a man up in the air and hold him there?

Concepts

Activities

Texts

A lever is a machine because it makes work easier. A lever can help lift heavy things.

There is a simple machine called a lever that will help a small boy lift a large load. Have the

Science Far and Near,
p. 243-244, p. 243-245.

(Grade III - Simple Machines)

Concepts

A ruler, a pencil, or any stick or bar used to lift something else is called a lever.

Problem 5: Should the weight to be lifted be on the long end or the short end of the lever?

Activities

children lift each other and the teacher by means of a brick and a six-foot board. If these materials aren't available, suggest that the children lift their fathers at home.

Let the children experiment with a smaller lever, lifting a pile of books on a table.

Texts

Science Far and Near,
p. 243-245.

Concepts

A lever will work better when the weight to be lifted is on the short end and you are pushing on the longer end of the stick or bar.

Activities

Using the above experiment, let the children experiment by placing the fulcrum in various places along the bar. Take the class to the playground to use a crowbar to pry up a large stone. Be sure the class sees it is lifted by pushing down on the handle of the lever. Let the children use a shovel to lift some dirt. Have the class come to the conclusion that you can lift a thing easier when it is on the short end of the lever and you are pushing down on the long end.

Texts

Science Far and Near,
p. 246.

Problem 6: Are all levers the same shape?

Concepts

Levers have different shapes and sizes.

Activities

Examine other tools such as claw hammer, can opener (lever type), screw driver, scissors, and pliers.

Texts

Science Far and Near,
p. 247.

Problem 7: What do levers do beside lift?

(Grade III - Simple Machines)

Concepts

Some levers pry, some pull, some twist.

Activities

Demonstrate the use of a screw driver, hammer and pliers. Use a pair of pliers to untwist wire.

Texts

Science Far and Near,
p. 247.

Problem 8: How do levers give us more speed?

Some levers help move things quickly.

Have a fishing pole in the room. Use it to demonstrate the principle that levers like this help move things more quickly. As levers are being studied, children can make drawings or posters displaying pictures of tools and machines which are levers. Another class can be invited to attend an assembly in which the children demonstrate the various kinds of levers instead of telling about them.

Science Far and Near,
p. 248-249.

Problem 9: How do wheels make work easier?

Concepts

There are two kinds of wheels. One kind moves freely on a stationary axle; the other is attached to the axle and turns with it as a unit.

Activities

Let the class examine a toy auto and the handle of a pencil sharpener or door knob. The wheels on the auto make the work easier by reducing the amount of friction. The other two examples turn with the axle as part of a unit. Have the children find at home examples of three things with wheels of each of the two types. If permission is granted, a door knob can be removed from the door and studied.

Texts

Science Far and Near,
p. 250-251.

Wheels are used to move things from place to place. These wheels move freely on a stationary axle.

Let the class experiment with pulling a box of rocks across the floor. Then put the load into a wagon and pull it across the floor.

Science Far and Near,
p. 250.

(Grade III - Simple Machines)

(Grade III - Simple Machines)

Concepts

Activities

Texts

When a big gear wheel turns, a small wheel's work is speeded up. One gear wheel will turn another because their teeth fit together.

List things in the school, in the home and in other places that have wheels which help move a load from one place to another.

Examine an egg beater. Have the children find out how many times the blades turn when the handle turns just once. Ask them to count the number of teeth on the large wheel and the number on the small wheel. They should be able to see that the small wheel has fewer teeth than the large wheel and therefore turns faster. Examine or discuss a hand drill, clothes wringer, an automobile steering wheel and any others. An old watch or clock offers a good example of gear wheels at work. Examine gears in mechanical toys. Explain how the teeth are necessary to keep the wheels from slipping when put rim to rim.

Science Far and Near,
p. 252-253.

Problem 10: Have you seen wheels working that do not seem to travel?

Concepts

Activities

Texts

A pulley is a wheel that turns, but does not travel.

A pulley carries things up and down or backward or forward.

The class should examine a flag pole, clothesline and fanbelt. They should see that a pulley is just a wheel with a rope around it. Ask where they have seen pulleys making work easier. Have the class arrange small pulleys with equipment from an erector set. Children who have lived on a farm perhaps know how hay is loaded into the hay mow.

Science Far and Near,
p. 250-251.

(Grade III - Simple Machines)

Concepts

A bicycle has two big wheels and two small wheels.

The two small wheels are connected by a chain. One of the small wheels is larger than the other. When this wheel is turned it makes the smaller one go. The small one is fastened to the big back wheel. That makes the bicycle go.

Activities

Have a bicycle brought in to the classroom. Show that the wheels act somewhat like a pulley.

Texts

Science Far and Near,
p. 254-255.

Problem 11: How does a ramp make work easier?

Concepts

Lifting heavy things up a ramp is much easier than lifting them straight up.

Less force is needed to pull a weight up a ramp than to lift it straight up.

The distance up a ramp is longer than the distance straight up, but the work is easier because the ramp carries part of the weight.

Activities

A question like the following will introduce the ramp (inclined plane). If you were a mover how would you manage to get a piano up into a truck? The children will be able to list other ramps. They have seen workmen pushing wheelbarrows full of concrete up a ramp, slanting roads, driveways. The class can experiment with a pile of books tied together. First, the books should be lifted, then pulled up a ramp.

If a spring scale is available, it can be attached to the ropes and the class can tell how much pull is needed.

The class can try slopes of varying degrees. They should discover the longer the distance, the less force needed.

Texts

Science Far and Near,
p. 256-258.

Science Far and Near,
p. 256-258.

Science Far and Near,
p. 256-258.

Problem 12: How does a wedge help make work easier?

(Grade III - Simple Machines)

Concepts

A wedge has one sharp edge that cuts and a thicker part that spreads the material apart.

Some wedges have long flat edges; others are pointed.

Parts of some plants and animals work like wedges.

Activities

Let the children examine a knife, needle and an ice pick to see the wedge shape of each. Have their uses demonstrated. Do the children see that the tool "wedges" itself in and pries one part from another.

Common wedges are axes, pins, nails, chisels, et cetera. Have the children mention others they know. Make a display of pictures or actual objects.

Observe the first part of a plant to appear above the ground. Its pointed shoot acts as a wedge. A porcupine defends itself from others by means of its sharp quills.

Texts

Science Far and Near, p. 259-261.

Science Far and Near, p. 259-261.

Science Far and Near, p. 261.

Problem 13: How can we keep our machines from rusting?

Concepts

If metal parts of tools or machines are covered with grease or paint, they won't rust.

Activities

Note that tools should receive good care. They should be kept dry. A carpenter coats his tools with grease when not in use. Other tools are painted.

Texts

ADDITIONAL ACTIVITIES

Levers

Get two boxes the same size. Fill one with a pound of sand. Put it on the long end of the lever. Put the other box on the short end of the lever and fill it with sand until the weight pushes the one-pound box up in the air. Weigh the box of sand to see how much the pound box lifted.

Push a door open. It is quite easy when you push near the handle. Push halfway across the door, then at other spots. Where did it take the most effort to open? Why?

A top-lifting desk can be tested in the same manner; first on the outside edge, then nearer and nearer the hinges.

(Grade III - Simple Machines)

Wheels and Pulleys

Make a display of toys with wheels and axles.

Report on the development and improvement of the wheel.

Make a chart showing different ways that pulleys can be used.

GENERAL ACTIVITIES

Bring many toys to school. Operate them and find the simple machines which are the basis of each.

Make a collection of pictures and mount them on charts or in a scrapbook. Have a category for the classification of each simple machine.

Collect pictures or make drawings of these machines at work.

Make a large drawing of gears to show how the teeth of one gear fit into the teeth of the other.

Visit a factory to see the machinery in operation.

List all the machines that people in your family use in a single day.

Examine a complicated machine to find out that it is made up of many simple machines.

Make a mural showing machines in different periods of history.

Make drawings to show safe ways to handle machines.

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(Grade III - Simple Machines)

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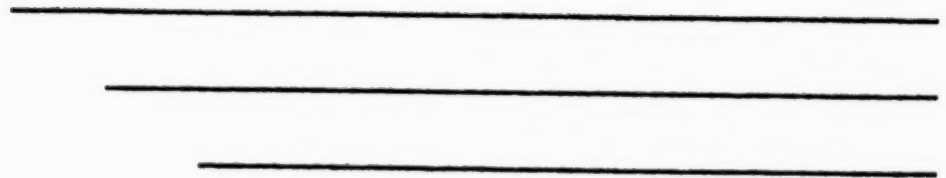
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SCIENCE and HEALTH

GRADES 4, 5, 6



(Grade IV - Plants and Seeds)

Concepts

GRADE FOUR

PLANTS and SEEDS

The aim in this unit is to develop an appreciation for plant growth and an interest in plant life, as well as to learn important information about plants, and become aware of the balance of nature.

Problem 1: What is the importance of plant life?

Concepts

Not only does our food come from plants, but hundreds of things we use every day also come from plants.

Activities

Locate things in the class-room, as well as in homes that come from plants.

List on charts samples of materials. Opposite each material, such as cocoa, rubber or linen, mount pictures or drawings of the plant from which it is made.

Text

Heath - Science In Your Life, p. 56.

Teacher's Guide

Problem 2: What do plants need in order to grow?

Concepts

There are five chief requirements for plant life--suitable soil, air, sunshine, proper temperature and water.

Activities

If possible, help children grow plants under a variety of conditions so they observe what happens.

Plant beans in individual containers. Plan and care for some of the seeds in the regular way. Plant others on wet paper instead of soil. Plant some in sandy soil.

Text

From those planted in soil deprive one of water, another of air (put a small glass jar over it and seal the rim with scotch tape), and a third, of sunlight (put a cardboard box around

(Grade IV - Plants and Seeds)

Concepts

Activities

Texts

it with a few air holes in the side). Allow all plants to reach as full growth as possible before making conclusions. Label each one and keep a record of what is happening.

Science In Your Life, Teacher's Guide,
p. 65.

Problem 3: How do we get more plants?

Concepts

Activities

Texts

New plants grow where ground was bare.

Find and watch a bare spot. New plants come up. Grass on sides closes in slowly. Use the experiment, p. 107, Science In Your Life.

Heath - Science In Your Life, p. 105-106.

Plants send out new stems.

Plant a grass clump and watch it grow. Plant runners from a strawberry plant. Use a growing strawberry plant. Bring in some bind weed. Note its characteristics. Grow plants in cartons, small wooden boxes or paper cups. Let certain children have charge of definite plants.

Heath - Science In Your Life, p. 107-108.

Plants store food in roots.

Plant a sweet potato in water. Keep a growing chart of the potato.

Heath - Science In Your Life, p. 109-111.

Place some pieces cut from tops of carrots or turnips in a saucer of water. Watch sprouts and leaves till food in pieces is completely used.

Ginn - Discovering With Science, p. 136.

Plants store food in bulbs.

Cut open an onion that has sprouted. See small plant. Plant narcissus bulbs and watch them grow.

Heath - Science In Your Life, p. 112-113.

Allyn and Bacon - Exploring Science-IV,
p. 46-48.

(Grade IV - Plants and Seeds)

Concepts

Activities

Texts

Plants store food in stems and leaves.

Cut a white potato into several pieces. Be sure there is an eye in each piece. Plant some in sand and some in water. Watch for roots and sprouts.

Ginn - Discovering With Science, p. 137-138.

Plant some leaves from an African Violet in water.

Start cuttings of several plants in water. When rooted, plant in soil. Start some cuttings in wet sand.

Allyn and Bacon - Exploring Science-IV, p. 36-39.

Plants store food in seeds.

Plant some lima beans. Soak over night, so they will sprout more quickly.

Heath - Science In Your Life, p. 126-128.

Sprinkle grass seed on a sponge. Place in a shallow dish of water. Keep sponge wet and watch grass grow.

Ginn - Discovering With Science, p. 132-143.

Problem 4: What are seeds and how are they formed?

Concepts

Activities

Texts

Seeds have many shapes and sizes.

Make a collection of seeds from many different kinds of plants, such as peanuts, corn, beans, apple seed, acorn and milkweed.

Heath - Science In Your Life, p. 124-125.

Ginn - Discovering With Science, p. 129-132.

A plant has special parts where seeds are made. Usually, these parts are surrounded by petals.

Use drawing of a flower showing parts. If possible, use a real flower that is large so parts can be easily seen.

Heath - Science In Your Life, p. 118-119.

Pollen is necessary in the production of seeds.

To have fruit, flowers and new seeds, the pollen must be carried from one flower

Make a list of ways pollen is carried. Draw pictures showing the different ways.

Heath - Science In Your Life, p. 120-123.

(Grade IV - Plants and Seeds)

Concepts

to another.

The color and fragrance of flowers attract birds and insects.

Activities

Make reports on some birds, insects, et cetera, that help to carry pollen.

Texts

Problem 5: How do seeds travel?

Concepts

Each seed has a special way of traveling, and nature has formed it so this can be done easily whether by wind, water or by animals.

Activities

Collect seeds to see how nature has provided for their traveling. Use milkweed, dandelion, maple, spanish needles, et cetera.

Texts

Heath - Science In Your Life, p. 129-131.

Problem 6: How do we make a garden?

Concepts

All seeds are not planted at the same time.

Activities

Make a chart for planting times. Discuss which seeds are planted outside and which ones need to be planted early in boxes. Learn how to plant seeds correctly by using flat-boxes, good soil, and right depth.

Texts

Singer - How and Why Club, p. 328-331.

Plants will grow from transplanted seedlings.

Grow some seedlings in classroom and transplant. Visit a greenhouse or have a florist visit class and show how to transplant.

Singer - How and Why Club, p. 332-334.

Cultivation is necessary for the maximum growth of plants.

Have reports on importance of cultivating and how it is done. Keep flatboxes that are planted in classroom, cultivated.

Singer - How and Why Club, p. 334-337.

Problem 7: What is a greenhouse?

Concepts

Temperature affects the growth of plants. In a greenhouse temperature is

Activities

Visit a greenhouse if possible. Build a small greenhouse or winter garden.

Texts

Allyn and Bacon - Exploring Science-IV, p. 40-45.

(Grade IV - Plants and Seeds)

Concepts

regulated to promote growth.

Activities

Make a terrarium.

Texts

Problem 5: How the seasons effect plants?

Concepts

Plants adapt to the season, going through a cycle of sprouting, growing, producing flowers, fruit and seeds, and then resting for a period.

Activities

Have reports on plants found in different seasons. Draw or collect pictures showing changes. Make a chart showing annuals, biennials, and perennials.

Texts

Ginn - Discovering With Science, p. 35-46.

Problem 8: Where do plants grow?

Concepts

Plants grow everywhere. The kind of plant depends on climate, soil, rainfall and growing seasons.

Activities

Correlate with the study of different countries of the world in social studies. Make chart showing kinds of plants grown in various regions. Collect pictures or draw these pictures.

Texts

Ginn - Discovering With Science, p. 51-63.

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Fs606 - Seeds and Seed Travel

Fs608 - Flowers, Fruits and Seeds

Fs609 - Plant Factories

Evaluations for this unit and other suggested references, films, filmstrips and ideas may be found in the manuals for the suggested textbooks.

GRADE FOUR

CLIMATE AND WEATHER

The aim of this unit is to help children understand how weather influences our lives every day, and to learn through observation, first-hand experiences, reading and experiments, the principles involved in solving the problems presented by weather conditions.

The concepts developed in this unit should help children understand many of the basic principles underlying any social studies unit, such as:

The climate in each region largely determines what kind of natural vegetation, native animal life and soil will be available to the inhabitants.

Climate plays a deciding role in man's distribution over the earth.

Climate directly affects man's industries.

Climate has considerable effect upon health, energy and body comfort.

Problem 1: What causes seasonal changes?

Concepts

The sun is the source of heat for the atmosphere. It heats the land and water and everything on it. The difference in the number of hours of sunlight is one reason for summer and winter weather.

Summer days are longer than winter days. The additional hours of sunlight give the earth more heat in summer.

Activities

Put one saucer of water in bright sunlight, and leave it there for ten minutes. Put another saucer of water next to it. Leave both saucers in the sunlight for another minute. One saucer has had sunlight for eleven minutes and the other for only one minute. Which is warmer? Try using a thermometer to test the temperature.

Darken the room and project the light from a flashlight straight down on a piece of paper. Draw a circle on the paper to show where the light

Texts

Heath - Science In Your Life, p. 5.

Heath - Science In Your Life, p. 151.

(Grade IV - Climate and Weather)

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
In summer the sun's rays are more directly overhead and give more heat. In winter the sun is lower in the sky and its rays are more slanting and give less heat.	falls. Now tip the flashlight so that the light hits the floor at an angle (as the sun shines when it is lower in the sky). Again indicate where the light falls by drawing a circle around the edge of it. Compare the two figures drawn. Note that when the light shines directly overhead, the spot of light is smaller, and the light is concentrated and gives more heat.	Ginn - <u>Discovering With Science</u> , p. 9-10.
The tilt of the earth's axis brings opposite seasons to the northern and southern halves of the world. The tilt of the earth's axis controls how far south or how far north the sun will shift each year. The sun shifts first to the north of the equator, then south of it, and then back again.	Make a chart showing the earth's positions during one trip around its orbit (one year, $365\frac{1}{4}$ days). Project the light from a flashlight on a globe, showing the "sunshine equator" with the Tropic of Cancer and the Tropic of Capricorn as the extreme limits of vertical sun.	Heath - p. 155. <u>Teacher's Guide</u> , p. 100-103.
When it is summer north of the equator, it is winter south of the equator. When it is spring north of the equator, it is autumn south of it.	Keep a chart of the daylight and darkness hours.	Heath - <u>Science In Your Life</u> , p. 234-240. <u>Teacher's Guide</u> , p. 99-103.
Air has weight and pressure.	Take a full glass of water. Lay a piece of cardboard over it. Hold the cardboard firmly to the glass, and invert it over a basin or sink. (The air pressure keeps the water in the glass.)	Ginn - <u>Discovering With Science</u> , p. 92-93.
Where air is dense, it exerts greater pressure. Where it is less dense and expanded, it exerts less pressure. Wind is air flowing from areas of high pressure into areas of low		Ginn - <u>Discovering With Science</u> , (Changing Air Pressure), p. 94-95. Heath - <u>Science In Your Life</u> , p. 18.

(Grade IV - Climate and Weather)

Concepts

pressure. Cold air is heavier than warm air.

Air expands when it is heated.

The velocity of wind depends upon the degree of pressure difference in adjacent areas. The primary causes for difference in air pressure is the unequal rates at which various parts of the earth's surface heat up and cool off.

Activities

Shut the door and open a window a few inches top and bottom. Tack a thin strip of paper to a window pole. Hold it to the top of the open window. Observe which way it blows. Now hold it near the bottom. Which way does the paper blow? Why? Note the cool heavier air is coming in at the bottom and is pushing the warm lighter air out through the top.

Snap a balloon over the neck of a bottle that can be heated without breaking. Put the bottle in a pan with a little water in it over a hot plate. The hot water will heat the bottle and the air inside. What happens? Why?

Use a convection box. Cut two holes in the top. Place a small tin can, which has both ends cut off, over each hole. Put a short candle in the box under one hole. Light the candle. Cover the open side of the box with a piece of glass. The candle heats the air around it. This heating causes an unequal pressure and the surrounding heavier air pushes in and forces the lighter air up the can. Do experiment with two blackboard erasers and electric light bulb.

Texts

Heath - Science In Your Life, p. 14.

Heath - Science In Your Life, p. 16.

(Grade IV - Climate and Weather)

Problem 2: How does water get into the air?

Concepts

Evaporation is going on all the time.

Warm air takes up more water than cooler air.

Evaporation is greater from a broad surface than from a narrow one.

Evaporation is slower if the air is already full of water.

Wind causes more evaporation. Fresh air brought by a wind can take up more water, because as the air is nearly saturated, it is moved away.

Moisture is given off into the air by plants and animals.

Activities

Put the same amount into two identical containers. Heat one and leave the other at room temperature. Compare the results. Wet two identical pieces of cloth. Place one in a warm location and leave the other at room temperature. Compare. Have pupils think of situations in which warmer temperatures have sped the process of evaporation.

Put the same amount of water into a tall, narrow olive bottle and into a saucer. (The water in the saucer will evaporate much sooner.)

Compare the time required for wet clothes to dry on a sunny day and a cloudy day.

Put two wet spots on the blackboard far apart. Fan one. Don't fan the other. Let children plan, observe and draw conclusions. Which one dries faster?

Get a potted plant and wrap the pot and soil with aluminum foil. Wrap the foil around the stem. Cover the plant with a large glass jar. Wrap another pot that has soil, but no plant. Cover this with a jar also. In a short time one will have a film of water along its side. Where did the water come from? How can you tell?

Texts

Heath - Science In Your Life, p. 22-23.

Blough - Elementary School Science and How To Teach It.

Heath - Science In Your Life, p. 185.

(Grade IV - Climate and Weather)

Problem 3: How does water get out of the air?

Concepts

Cooling the air may cause water to condense.

Water condenses on many cool surfaces.

Activities

There are many experiments that show how water condenses out of the air by cooling. Place in a tin cup some some ice and salt. Stir the mixture for a few moments and note the droplets of water on the outside surface. Let pupils formulate theories as to where the droplets come from. After they have decided that the air is the only place from which it could have come, they must answer the question, "What was done to make the droplets come out of the air?" (Note the cup cooled the air with which it came in contact.)

Pupils may observe condensation taking place on cold water pipes and faucets, on pitchers of cold liquid, on a cold window or a cold mirror on which they blow their breath.

Texts

Heath - p. 124,
(Experiment showing condensation)

Problem 4: What are other forms of water vapor?

Concepts

Fog is like a cloud near the ground. Dew does not fall, but is water vapor chilled as the air touches the cooler ground.

Frost is formed in the same way as dew except that the temperature of objects upon which condensation occurs is below the freezing point. Snow is frozen water vapor. Sleet is rain that freezes as it falls. Hail may start as rain, but freezes in layers as it falls, and is swept up by a strong current of rising air, again and again.

Activities

Texts

Heath - Science In Your Life, p. 24-31.

Problem 5: Why are high lands cooler?

Concepts

Altitude can alter the effects of the sun's rays. Places at high altitudes are normally cooler than those nearer sea level. The sun shines just as hot on a mountain as on a lowland, but the thinner air at high altitudes is less effective in retarding the loss of heat by radiation.

Activities

Have the children compare the blanket of air covering the earth to the blanket which holds the warmth next to them. A thick blanket is warmer than a thinner one. Discuss why the high mountains have a thinner blanket of air.

Texts

Heath - Science In Your Life, p. 168-169.

Air is transparent. Sunlight shining through it does not heat it. Sunlight heats the earth. The earth heats the nearby air.

Place a paper near a closed window with the sun shining on it. Compare the heat of the glass through which the sun came with the heat of the paper.

Heath - Science In Your Life, p. 169-170.

Problem 6: How are land areas along large bodies of water tempered by the water?

Concepts

Water does not heat up as quickly as land. Water does not cool off as rapidly as land. Therefore, seasonal temperature changes of oceans and lakes are less than those on land. Land areas along water are warmer in winter and cooler in summer than adjoining inland sections.

Activities

Put some dry soil into one dish and pour some water into another dish, (same temperature). Put both dishes in a sunny place and leave them for ten minutes. Observe which one has warmed up faster. Use a thermometer.

Texts

Heath - Science In Your Life, p. 9-13.

Put two bowls, one of water and one of soil, into the refrigerator for 15 minutes. Compare temperatures. Which cooled off more quickly?

Heath - p. 11.

(Grade IV - Climate and Weather)

Problem 7: Why does it rain so much in some parts of the world?

Concepts

Rainfall is supplied by convection circulation. Under the hot rays of the sun the warm air begins to rise. Ascent causes the warm air to expand and cool. Condensation produces heavy showers almost everyday.

The sun's rays are almost vertical at all times, and days and nights are practically equal the year round.

The humidity is high, and the heat becomes unbearably oppressive. The climate fosters a thick plant growth.

The jungle occurs along the edges of the forests, the streams and clearings - the areas reached by the sun. The soils are not rich because of prolonged leaching and rapid decomposition of organic matter. There is an abundance of native animal life. The population in countries with this climate is ordinarily small, because of climate, dense forest, insects and deadly diseases.

Activities

Do an experiment showing how warm air expands. Hold a cool glass above the steam of a teakettle. What happens?

Make a picture chart of plants. Write stories of plants we need which grow only in this hot, humid climate, such as rubber and cacao and others. List other important products. Write stories, telling the many ways climate affects the life of the people.

Make a zoo of animals common to this climate. Discuss animals we have seen in the circus or zoo. Find out why animal life in the rain forest is mainly aboreal.

Texts

Heath - Science In Your Life, p. 14-15.

Ginn - Discovering With Science, p. 96.

Heath - Science In Your Life, p. 160-161.

Problem 8: How life adjusts to a Cold Climate?

Concepts

The farther you move away from the area of the equator and the long hours of direct sun rays, either to the north or to the south, the cooler you will find the climate. Both polar regions are far away from the direct rays of the sun and receive very

Activities

Repeat experiment with flashlight. Clarify meaning again of vertical, horizontal, and slanting sun's rays. Use a flashlight. Show how the sun's rays fall on this part of the earth.

Texts

Ginn - Discovering With Science, p. 151-153.

(Grade IV - Climate and Weather)

(Problem 8 - continued)

Concepts

Activities

Texts

little heat because the rays fall so slantingly. These zones have the coldest climate. Near the poles, the winters are long and there are many hours of darkness.

The summers are short and they have long hours of daylight. Most of the Polar Zone lies within the Arctic and Antarctic Circles. The circles mark the beginning of the sun's disappearance. The farther one goes toward the poles, the longer the period of the sun's disappearance in winter. At the pole itself this amounts to nearly six months.

During most of the year the ground is frozen and covered with snow. The Eskimos have adjusted to this land of ice and snow. Certain plants are adapted to live here such as mosses, lichens, buttercups, dandelion, squat cranberry and many others. Hunting and fishing are the people's chief means of making a living.

Mount pictures of the plant life found here. Find out how they are adapted to their surroundings.

The animals are adapted to the climate. The population is sparse because of the climate.

Study pictures of animals. How are they fitted for this climate?

Read and discuss how each animal is used by the people. Show films.

Heath - Science In Your Life, p. 143.

Heath - Science In Your Life, p. 144-156.

Problem 9: How does a climate with great temperature contrasts affect the life of its inhabitants?

Concepts

Activities

Texts

Between the cold zones and the hot zones there is an

Make a map showing divisions. Locate countries in the

Heath - Science In Your Life, p. 163.

(Grade IV - Climate and Weather)

(Problem 9 - continued)

Concepts

intermediate zone commonly called the temperate zone (the cyclonic zone). This climate is characterized by four well-marked seasons. It has greater extremes of temperature from season to season, and has pronounced changes of weather from day to day. These great temperature contrasts result from air masses that come in from the polar regions as well as the tropical regions. All the great nations are concentrated in this zone.

It has the highest industrial development.

The climate is favorable for agriculture.

The natural vegetation varies from open grassland to deciduous forests. The average growing season is five or six months, depending upon latitude, altitude and distance from large bodies of water.

Climate goes far to explain why countries in this zone grow a large part of the world's crops, cut much of its timber, mine the bulk of its minerals and carry on much of its trade.

Here we find the world's largest cities.

The climate stimulates man toward greater achievement.

Activities

temperate climate belt.

Keep a temperature chart through the year. Compare extremes of temperature.

List some of our major industries. Explain their reason for development.

Find pictures.

Have children list plants grown in their locality.

Find out when they are planted, how long they grow and length of growing season.

Discuss with children who have an outdoor garden such things as hours of sunlight, temperature of soil and air, amount of rainfall, kind of soil, et cetera. Locate, and draw maps.

Texts

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(Grade IV - Climate and Weather)

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Filmstrip - page 26, Teacher's Guide, Ginn: Discovering With Science.

Editorial Staff of Life: The World We Live In.

GRADE FOUR

WATER

In this unit the children will find out why water is important to all living things, why underground storage of water affects the land we live on, how water is collected and stored in reservoirs, and how water is purified and why it needs to be purified.

Problem 1: Is water found in plants and animals?

<u>Concepts</u>	<u>Activities</u>	<u>Text</u>
Water is vital to all living things - people, animals and plants. A large part of every living thing is water.	Squeeze the juice out of an orange. Let the juice stand for a while and then look at it. Note that almost every drop of the clear liquid is water. Let all the water evaporate from the juice. You will have very little solid material left. Make an exhibit of dehydrated or dried foods. Press some juice out of a piece of meat. Collect the liquid in a glass and let it stand. The clear liquid is almost entirely water. Pour the liquid into a dish and let it evaporate. Very little of the solid material is left.	<u>Science In Your Life</u> , p. 177-182.

Problem 2: How do plants and animals use water?

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Living things take in more water than they need each day. They give out much of this water in various ways.	Ask the children to keep track for a day of how many glasses of liquid they drink. To impress upon them the amount they consume, measure the amount in class, using a large pitcher or bowl. Breathe on a mirror. Watch the mirror become cloudy.	<u>Science In Your Life</u> , p. 183-185.

(Grade IV - Water)

(Grade IV - Water)

Concepts

Activities

Texts

Now touch the mirror and feel how wet it is. This wetness is a thin film of liquid water.

Get a potted plant and wrap the pot and soil with aluminum foil. Wrap the foil around the stem. Now cover the plant with a large glass jar. Wrap a pot of soil (no plant), and cover this pot with a jar. After a few minutes look at the jars. You will find that the jar with the plant has a film of water along its sides.

Problem 3: What are cells?

Concepts

Plants and animals are made up of millions of cells, too tiny to see with the naked eye. The cells are of various shapes and sizes.

Activities

Use a microscope to see cells of many different kinds of plants and animals.

Texts

Science In Your Life, p. 186-190.

Problem 4: How is water used by cells?

Concepts

Cells must have food and other materials to keep alive and grow. There are no special openings through which the food can enter cells. Water can carry many kinds of materials. Food, and air dissolved in water, can enter the cells. Blood is mostly water. As it flows through the body, it carries necessary supplies to the cells and carries away waste materials.

Activities

Fold paper into a cone. Make sure there is no opening in the bottom of the cone. Pour a little sugar into the cone. Touch the underside of the cone and then taste your fingers. The dry sugar cannot pass through the paper. Now pour a little water into the paper cone. As the water soaks through, catch a few drops and taste them. The sugar and water pass through the paper.

Texts

Science In Your Life, p. 191-193.

(Grade IV - Water)

Problem 5: What happens to water that falls on the earth?

Concepts

The world's water never stops traveling. The sun's heat draws it up, the cool air makes it fall again. It may travel thousands of miles after it reaches the earth.

Activities

Mix together three-fourths sand and one part soil. Pack it in a slanting position against one side of an aquarium. This will be a little hill on which rain can fall. To make it rain, use a sprinkling can. Let the rain fall on top of the hill. Some of the water streams down along the surface of the hill. It will form a puddle at the base of the hill. The soil will darken under the surface because of the water soaking down into the soil.

Texts

Science In Your Life, p. 196-198.

Problem 6: What happens to the water that soaks into the ground?

Concepts

Water seeps underground until it reaches nonporous rock or soil. There it gathers. The depth where nonporous rock is found varies, but water can be found almost anywhere in the world if we dig deep enough.

Activities

Make a list of things children wear that are porous. Make a list of things children wear that are nonporous. To see water spread through a porous material, color a teaspoon of water with some red ink. Touch the corner of a lump of sugar to the colored water. Keep sprinkling your hill in the aquarium. You will see that more and more of the soil becomes dark, as the water soaks down from the top. After a while it will soak all the way down to the bottom of the aquarium. Point out that the water will stop at the bottom because the bottom is made of glass or stone.

Texts

Science In Your Life, p. 199-201.

(Grade IV - Water)

(Grade IV - Water)

Problem 7: How do we dig for water?

Problem 10: How do you train a swamp?

Concepts

Activities

Texts

The top line of water in the soil is called the water table.

Pour sand into an aquarium. Make a layer about eight inches deep. Pour in water and let it soak down until the layer of water is about six inches deep. The top line of the water in the soil is called the water table. With a spoon dig a hole in the sand until you reach water. You will have a pool or water hole.

Science In Your Life, p. 202-203.

Problem 8: What are wells?

Concepts

Activities

Texts

When the underground water is near the surface, there are natural water holes.

Take an empty tin can with its top and bottom cut out. Work the can into the sand of the aquarium until the top of the can is an inch or two above the sand.

Science In Your Life, p. 203-204.

Man-made water holes are called wells. They are dug down into the underground water and are lined with nonporous materials.

Now scoop out the sand inside. You will see water coming up to take the place of the sand. Dig all the way down. The can will have water in it. The water is at the same height as the underground water in the aquarium.

Problem 9: What are swamps?

Concepts

Activities

Texts

Swamps are places where underground water is very close to the surface or slightly above it. Plants which can live where there is a lot of water grow in swamps. Certain animals adapted to water can live among the plant growth.

Using your aquarium which contains sand, pour in just enough water to reach the surface of the sand. Now you have a swamp.

Science In Your Life, p. 205-206.

(Grade IV- Water)

Problem 10: How do you drain a swamp?

Concepts

Swamps are too wet for good farming. If the water table is lowered by draining, swamps can be made into useful farm lands.

Activities

For this experiment you will need a rubber tube two feet or more in length, a spoon, and a basin. Scoop out a hole at one end of the swamp in your aquarium. Fill the tube with water by holding one end of the tube under the faucet until water begins to come out of the other end. Then pinch both ends with your fingers to keep the water from flowing out. Still pinching, put one end into the hole you scooped in the swamp. Put the other end of the tube into the basin which is lower than the aquarium. The water will flow into the basin.

Texts

Science In Your Life, p. 207-208.

Problem 11: What is a lake?

Concepts

A lake is formed where the water table is above the surface of the land.

Activities

Make a little lake in your aquarium.

Texts

Science In Your Life, p. 209-210.

Problem 12: What is a desert?

Concepts

In a desert the water table is very far below the surface. A desert is formed when the underground water is too deep to be of use to plants and there is little rain. The plants that grow in deserts have special ways of using what little water is available. Water that is deep underground in a desert can be brought to the surface by power pumps. With water, deserts can be changed to useful farm lands.

Activities

Have the children bring in cacti plants. Find out how these should be cared for.

Texts

Science In Your Life, p. 210-211.

(Grade IV - Water)

Problem 13: What causes deserts?

Concepts

Mountains can make deserts. Moist winds, carrying water vapor, are cooled as they rise up the slope of a mountain. When water vapor is chilled it collects into raindrops. On the other side, as the air descends, it is warmed and increases its capacity for holding moisture. Hence, this area is dry. Some regions are deserts because they are far from the sea. The warm moist winds have cooled and lost moisture on the way.

Activities

Put some ice cubes and water in a clean dry jar. Cover the jar and let it stand. You will soon see a film of water on the side of the jar. Have children observe how bigger drops are formed and fall down the sides of the jar.

(The ice cubes chilled the water vapor in the air around the jar and formed rain.)

Texts

Heath - Science In Your Life, p. 24-25. Teacher's Guide, p. 24.

Heath - p. 171.

Problem 14: How do you take land from the sea?

Concepts

Countries such as Holland have reclaimed rich farm land from the sea bottom by using dikes to hold the sea back and by pumping the water out of the land on the other side.

Activities

Build a model dike.
(Page 215 in Heath.)

Texts

Science In Your Life, p. 212-215.

Problem 15: Why is the depth of the water table important?

Concepts

The depth of the water table determines whether the land will be swampy, productive farm land, or desert land.

Activities

Collect or draw pictures of water in the ground and on the surface. Include pictures of lakes, swamps, wells, springs and water holes.

Texts

Science In Your Life, p. 216-217.

Problem 16: Why is water filtered?

Concepts

Even though water looks clear and tastes good, it may not be fit to drink.

Activities

Examine a drop of water under a microscope. Make a filter out of a milk

Texts

Science In Your Life, p. 220-224.

(Grade IV - Water)

(Problem 16 - continued)

Concepts

It may contain disease germs, too tiny to see without a microscope.

There are many ways in which water can become polluted. Therefore, most communities have water departments with inspectors to check on the purity of the water. Water can be cleared of many foreign substances by means of filters.

Activities

carton. Punch many little holes in the bottom of the carton. Then pour in about three inches of gravel. On top of the gravel add three inches of sand.

Rest the carton on a drinking glass. Pour muddy water on top of the sand. Let it filter through. The filtered water is clear.

Texts

Science In Your Life, p. 220-224.

Problem 17: How are germs killed in water?

Concepts

Disease germs in water can be killed by adding a small amount of chlorine.

Activities

Get some stagnant water. Put a drop of the water on a microscope slide. Then look through the microscope to see whether you have tiny animals swimming around. If you have these animals, put a tiny bit of bleaching water on the drop of stagnant water. The chlorine in the water will kill the tiny animals very quickly. It also kills any disease germs that may be in the water. The tiny dead germs are completely harmless. Draw up some safety rules about drinking water when away from home. Evaporate water to show that it contains dissolved minerals.

Texts

Science In Your Life, p. 225-226.

(Grade IV - Water)

Problem 18: Why and how is air put into water?

Concepts

Spraying water through the air gives it a fresh, clean taste.

Activities

Take a trip to the local water works. List the many ways in which we use water.

Collect pictures showing the uses of water.

Texts

Science In Your Life, p. 226-227.

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GRADE FOUR

POWER

The purpose of this unit is to help children develop understanding of how power is created; the types of power and the many uses to which each can be put. Pupils should gain an appreciation of the vast amount of energy that can be created to work for man and the great power potential that remains untapped and is daily going to waste.

Problem 1: What is power?

Concepts

Power is needed to do work.
There are many types of power.
Some types are new and still in the process of development.
Some things have helped man increase the output of work for the same amount of power (i.e., wheel). Other improvements have taken place throughout history.

Activities

List types of power. Bring in pictures indicating each.

Texts

Heath - Science In Your Life, p. 242.

Problem 2: Muscle power - How and why was it used?

Concepts

Muscle power is man's basic source of power. He relied on it for his needs. New ideas increased man's output.

The lever can increase the amount of work done by muscle power.

The wheel can increase amount of work done by muscle power.

Animal power is a form of muscle power.

Activities

Make a list of activities of early Akron pioneers requiring muscle power. Do experiments using marbles (as ball bearings) pencils (as rollers) and levers to illustrate how increased work may be accomplished with same amount of muscle power.

List different types of animals that give muscle power to man throughout the world.

Texts

Heath - Science In Your Life, p. 242.

Heath - Science In Your Life, p. 34-57.

(Grade IV - Power)

(Grade IV - Power)

Problem 3: Wind power - How is wind used as power?

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Ships used winds to sail. Sail boats still use it. Windmills are used for pumping water, and some for generating electricity, a different source of power. Wind power is not reliable.	Make pinwheel type windmill to illustrate how blades pick up wind.	Heath - <u>Science In Your Life</u> , p. 243-245.

Problem 4: Water power - How is water a source of power?

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Water has been used many years as a source of power. It can move or push. It is more reliable than wind power. Water wheels are still in use in many parts of the world.	Convert a wind wheel into a water wheel. List uses for water wheels. Build a dam in an aquarium to illustrate storage of water for power.	Heath - <u>Science In Your Life</u> , p. 246-248.
Water is used to generate electricity, another type of power.		Heath - <u>Science In Your Life</u> , p. 249-250.

Problem 5: Electric power - How does electricity serve as a source of power?

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Electricity can be generated by water power. It can be sent through wires to do many types of work. Electricity flowing through wires creates a magnetic attraction. When a wire carrying an electric current is wound around an iron core, both become magnetized, forming an electric magnet. An electromagnet can be used to make an electric motor. Electricity is necessary to make the electromagnet. Electric current is either direct or alternating. An electric motor runs many electric appliances.	Make a list of all the things that are run by electricity in your house. Bring in pictures of all the things that can be run by electricity for a bulletin-board display. Demonstrate magnetic attraction of electricity flowing through wires. Build an electromagnet. Divide class into groups with each group building an electric motor.	Heath - <u>Science In Your Life</u> , p. 249-250. Heath - <u>Science In Your Life</u> , p. 251-254. Heath - <u>Science In Your Life</u> , p. 255. Heath - <u>Science In Your Life</u> , p. 256. Heath - <u>Science In Your Life</u> , p. 257.

(Grade IV - Power)

Problem 6: Steam power - How can steam be converted into power?

Concepts

Water can be converted into steam which, in turn, can be converted into a form of power. Steam is vapor from boiling water. It can push with great force.

The steam turbine is a type of steam engine. It is run by steam pushing against the blades. If a spinning turbine is joined to an electric generator, causing the generator to spin, electricity is created. Steam turbines are joined to ship's propellers, causing them to spin and propel the ship through the water. Steam turbines need fire to heat water to boiling. At this point it turns into steam to push against the blades of the turbine. New atomic powered submarines, like the Nautilus, use atomic power to convert water into steam to drive the turbine that turns the propellers.

Activities

Look up pictures of steam-driven engines and things powered by steam. Bring in pictures illustrating atomic submarine engines to show that atomic power converts water into steam power.

Do an experiment to illustrate steam pressure coming from spout of teakettle.

Texts

Heath - Science In Your Life, p. 258.

Heath - Science In Your Life, p. 64.

Heath - Science In Your Life, p. 259.

Heath - Science In Your Life, p. 260-261.

Heath - Science In Your Life, p. 260-261.

Problem 7: Gasoline power - How is gasoline used to produce power?

Concepts

Gasoline engines are lightweight engines that start quickly. The power comes from burning gasoline.

Gasoline is burned inside a metal case that has a piston which slides back and forth. When it burns it gives off gases which heat and expand rapidly, causing the air to push the piston. The piston is attached to a rod which it causes to turn.

Activities

Bring in pictures of things using gasoline engines.

Texts

Heath - Science In Your Life, p. 261-264.

(Grade IV - Power)

Concepts

Gasoline is fed into the engine again and burned again. This is a continuous process.

Activities

Texts

Problem 8: Diesel power - How does a diesel engine differ from a gasoline engine?

Concepts

A diesel engine uses oil instead of gasoline. It can pull heavy loads.

Activities

Make list of things using diesel engines.

Texts

Heath - Science In Your Life, p. 265.

Problem 9: How does a jet engine develop power?

Concepts

Air is pulled into a jet engine and compressed and heated. It is pushed out the back of the engine at a very high speed. The push of these gases send the plane forward.

Activities

Use balloon illustration, Blow it up and then release the air. Collect pictures of jets and compare speed to those of propellor-driven planes. Use balloon to indicate compression effect by pushing against sides of balloon.

Texts

Heath - Science In Your Life, p. 85-89.

Problem 10: How does a rocket develop power?

Concepts

A rocket carries its own fuel and air. Air is necessary for burning. A rocket can go where there is little air because it carries its own oxygen. That is why only a rocket can ever get to outer space. A rocket does not need an air scoop.

Activities

Texts

Problem 11: What other types of power are there and how do they differ from the ones that we have mentioned?

Concepts

Atomic power is being derived from metals that are radio active. This metal is used as a fuel to create power for

Activities

Compare power derived from one pound of atomic fuel to tons of other types of fuels.

Texts

(Grade IV - Power)

(Problem 11 - continued)

Concepts

running submarines, generating electricity, et cetera.

Solar power is received from the sun's rays. This is stored in batteries to be converted into electrical energy.

Some telephone systems are being run by solar energy.

Activities

Find statistics telling the amount of power available if the sun's energy could be utilized for one day.

Read about a solar oven and how it is used.

Texts

GRADE FIVE

LIVING THINGS - INSECTS

The purpose of this unit is to help boys and girls to understand the interdependence of living things, both plant and animal; to show them that some of the more common insects have adaptations for survival, and to develop an appreciation of the help insects give to man, and an understanding in a broad sense of their economic importance, both directly and indirectly. In addition, children will learn that nature is able to regulate the balance in nature, and that it may be better for man to attempt to control his insect enemies, rather than disturb or upset this natural balance.

Problem 1: What are insects?

Concepts

Activities

Texts

Insects are animals

There are over 650,000 different kinds of insects; more than any other kind of animal.

Have children name all the different insects that they can.

(All references are fifth-grade textbooks unless otherwise noted.)

Insects change form in the process of becoming adults. Some go through a complete metamorphosis, while others go through an incomplete metamorphosis.

Webster: Let's Read About Insects.

Singer - p. 96-100.
Heath - p. 103-104.

Complete metamorphosis:

- (a) egg
- (b) larva or caterpillar
- (c) pupa or cocoon
- (d) adult

Secure cocoons and caterpillars, and observe the stages through which the animals pass.

Ginn - p. 248-251.
Allyn - p. 302-303.

Incomplete metamorphosis:

- (a) egg
- (b) nymph
- (c) adult

Use charts and specimens available for class study.

Allyn - p. 294-295.
Ginn - p. 134.

All insects have six legs, two feelers, and their bodies are divided into three parts:

- (a) head
- (b) thorax
- (c) abdomen

Secure several insects. Observe the three parts of the body. Use a microscope or a good hand glass to observe closely the individual parts, such as legs, feelers, eyes, mouth.

Heath - p. 103-104.

(Grade V - Insects)

Concepts

Feelers (antennae) serve as "fingers," "tongue" and nose.

Activities

Texts

Problem 2: What do insects need in order to live?

Concepts

Insects, like other animals, need air and food.

Activities

Texts

- (1) Breathing is done through special holes on the sides of the abdomen.
- (2) Some insects are chewers and others are suckers.

Secure an insect and observe by use of a magnifying glass the breathing holes.

Heath - p. 104.

- (a) Those that suck may live on sap, blood or nectar.

Observe the heads of several insects and note the adaptation of each.

Ginn - p. 129-139.

- (b) Those that chew may live on wheat, corn, fruit, vegetables, wool, or other animals.

A praying mantis may be kept and fed, but the food must be living insects.

Row-Peterson - Insects and Their Ways.

Insects have various characteristics which enable them to live in certain places and protect themselves by various means:

Observe various insects and show insects by groups according to their characteristics, as:

Row-Peterson - Insects and Their Ways.

- (1) color
- (2) secretions
- (3) wings
- (4) shape
- (5) armor (chitin)

- (1) grasshopper
- (2) ladybird or ladybug
- (3) butterfly
- (4) walkingstick
- (5) beetles

Allyn - p. 190.
Singer - p. 76.

Problem 3 - Which insects live in "societies"?

Concepts

Bees, wasps, ants and termites are social insects.

Activities

Texts

Row-Peterson - Insect Societies.

Allyn - p. 4-24.
Ginn - p. 246-251.

(Grade V - Insects)

(Problem 3 - continued)

Concepts

Bees are classified as workers, queens and drones. Each has a task to do within the hive.

Honeybees and wasps are different in their types of nest, material for hives, and in honey making.

Ants are classified as queen, workers and winged male.

Ants keep "cows" (aphids). Each family has its own ant-hill. The workers have specific jobs to do, such as nurses, builders, housekeepers and soldiers.

Termites have in their colony a queen, workers, soldiers and winged adults. Termites do not work in the light. Termites build "tunnels" to go from nest to place of feeding within the building.

Problem 4: Which insects are harmful to man?

Concepts

Which insects are harmful to man?

- (1) Crop and garden pests
 - (2) Forest, shade-tree pests
 - (3) Orchard pests
 - (4) Building and food storage pests
 - (5) Clothing pests
 - (6) Disease carriers
- are all harmful to man.

Activities

Show a section of a bee hive. (A section of an actual hive can be obtained for classroom observation from the A. I. Root Company.)

Try to obtain an abandoned wasp's or hornet's nest. Carefully take it apart to observe how it is made.

Dig up an anthill. Be sure to get the queen. Place in a jar and cover the outside with black paper. The ants may be observed by removing the paper for a very short period of time.

Obtain information from local pest control companies.

Try to have one of their men give a talk to the class about termite control.

Activities

Arrange a bulletin board or table display of pictures of damage, or samples of actual damage done by insect pests.

Draw attention to the cost to man - the value of damaged goods.

Texts

Row-Peterson - Insect Societies.

Ginn - p. 246-249.
Allyn - p. 16-24.
Heath - (4th grade), p. 134-138.
Singer - p. 304-325.

Ginn - p. 250-251.
Allyn - p. 6-15.
Heath - (4th grade), p. 139-140.
Singer - p. 340-357.

Row-Peterson - Insect Societies.

Singer - p. 60.

Texts

Row-Peterson - Insect Friends and Enemies.

Heath - p. 131-132.
Ginn - p. 130-139, 271.

(Grade V - Insects)

(Problem 4 - continued)

Concepts

Activities

Texts

Insect enemies can be controlled by poisons and by other animals.

Problem 5: Which insects are beneficial to man?

Concepts

Activities

Texts

Insects that pollinate fruit trees and flowers, and that provide fibers for clothing are beneficial.
Control of insect enemies.

Display pictures or products that are produced by our insect friends.

Row-Peterson -
Insect Friends and Enemies.

Allyn - p. 278-279,
p. 284-285.

Some plants must be cross-pollinated before producing good fruit.

In some parts of the world, insects are a regular part of the diet.

Insects produce fibers which we weave into clothing.

Problem 6: What part do insects play in the balance in nature?

Concepts

Activities

Texts

Find out how wheat would be affected if there were no insects.

Capitol Publishing Company - Adventure Book of Insects, Chapter 2.

The following chart summarizes the work of each member of the hive of the honeybee: *

Member

Sex

Duties

Queen

Female

Leads swarm
Lays eggs

Workers

Undeveloped females

(Gather: (Nectar
(Pollen
(Propolis (bee
(wax)

* Singer - Teacher's Manual and Science Handbook.

(Grade V - Insects)

(Chart - continued)

<u>Member</u>	<u>Sex</u>	<u>Duties</u>
Drones	(one mates with queen, others have no function)	Manufacture: (From Nectar) (honey wax) (From Pollen) (bee bread) (and Nectar) (royal jelly) Build hive: (Storage cells workers' size) (Brood cells workers' size) (drone size) (queen size) Care for queen Feed drones Nurse young bees (clean it) Care for hive (repair it) (ventilate it) Select (her site for swarm) (new queen)

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(The story of what goes on in a beehive and in the field.)

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GRADE FIVE

WEATHER

The units on weather in this publication illustrate the spiral development of topics in the Heath basic texts as they are treated at different grade levels.

The purpose of this unit is to help the children understand that weather is important to all of us; that it is made up of many, many components which vary constantly from place to place, season to season, hour to hour; that many instruments are used to measure the factors which make up the weather; that as yet, a foolproof method of accurate weather forecasting has not been found, but the United States Weather Bureau forecasts are relatively reliable; and that we must use the cause and effect method of thinking to check the validity of the many superstitions about the weather.

Problem 1: What are the components of the weather?

Concepts

Activities

Texts

The components of weather are:

Change of temperature occurs from day to day, hour to hour.

Place a thermometer outside a window. Be sure the sun never shines on it. An alcohol thermometer is the best kind to use, since red alcohol can be seen more easily than silver mercury. Keep a record of the change in temperature.

(All are 5th-grade basic texts unless otherwise noted.)

Ginn - p. 46-48.

Heath - p. 323.

Paint an outline map of the United States and/or Ohio on an old blackboard. Each day have children bring in temperatures from various sections of the country that they hear on radio or find in the newspaper. Put them on the map in chalk. Each day they may be erased and revised.

Change of wind speed. Wind is moving air. Weather might be thought of as changes taking place in air. The speed of the wind often marks the speed of the weather change.

Make a wind-speed chart from observation of movements of trees, flags, et cetera. It may be based on the Beaufort Scale which can be found preceding the bibliography at the end of this unit. (See Ginn - page 49.)

Ginn - p. 48-49.

Singer - p. 183.

Heath - p. 313.

Heath - Fifth Teacher's Guide, p. 117.

(Grade V - Weather)

(Problem 1 - continued)

Concepts

An anemometer measures the speed of the wind.

Change of wind direction. Wind is always named after the direction from which it is blowing. The direction of the wind is indicated by a wind vane, which points in the direction from which the wind is blowing (because the sail side of the arrow is larger than the point side, and catches more wind).

Winds that blow steadily in the same direction are called prevailing winds. They often cause an ocean current. There is a prevailing wind movement in a room where there is a fireplace and a window. Air expands and becomes lighter when it is warmed and it is pushed up by cooler, heavier air.

Activities

Make an anemometer. Use a wire coat-hanger and two crossed strips of thin wood. Make a hole in the wood, just large enough to hold the medicine-dropper pivot. When wood is crossed over pivot, cut slots in 4 pointed paper cups (one painted) and attach to wood. The number of turns the anemometer makes in 30 seconds divided by 5 equals the approximate miles an hour the wind is blowing. (See Heath, pages 315-316, for detailed diagram.)

Chart wind direction.

Build a wind vane. (See Heath, pages 313-314, for detailed instructions and diagram.)

See Filmstrip "Atmosphere and Its Circulation."

Make an air movement indicator. On a card, draw three circles inside each other with a compass. Draw three lines across the center of the circles. With a sharp knife, cut along the heavy lines. Bend out cut parts along the dotted line. Make a pinhole in the center and push a snap fastener (the kind without a hole in the middle) into it. Push the point of a needle into the eraser on a pencil, and stick the pencil into a

Texts

Heath - p. 315-316.

Ginn - p. 48.

Heath - p. 313-314.
Singer - p. 182.

Heath - p. 12-13.
Singer - p. 180-183.

(Grade V - Weather)

(Problem 1 - continued)

Concepts

Activities

Texts

spool. Set the card on the needle. It is now ready to show warm rising air and cold descending air.

Over a warm radiator or lighted lamp, the wheel spins one way. Directly under a refrigerator door opened an inch or two, it will spin the other way.

Cut a hole in the top and one in the side of a small box. Put a candle in the box and place a lamp chimney over the hole in the top of the box. Light the candle. Hold a piece of burning punk near the hole on the side. Smoke will enter and come out the chimney. As the air in the box becomes warm, it expands and rises and is replaced by cooler outside air.

Heath - 4th,
p. 13-20.

Singer - p. 180-181.

Allyn and Bacon -
p. 95-99.

The heat at the equator and the cold at the poles are the main causes of ocean currents and prevailing winds over the ocean.

Find weather maps, particularly of prevailing winds. Practice reading weather maps.

Heath - p. 12-15.

The direction of the wind often tells the kind of weather change to expect. A north wind often brings cooler weather while a south wind often brings warmer.

Note warmer temperatures in southern states and cooler in northern states.

Heath - p. 313.

Change of humidity.

The amount of moisture in the air is called humidity. The water in the air is called water vapor.

Have children listen to weather reports and bring in humidity reports day by day. Chart percentages.

Singer - p. 187-188.

Allyn and Bacon -
p. 110-111.

(Grade V - Weather)

(Problem 1 - continued)

Concepts

Activities

Texts

When very moist or humid air is cooled, moisture condenses and forms raindrops. The approach of rain is usually marked by increased humidity.

The amount of moisture in the air, or the humidity, is measured by a hygrometer.

Make a hair-hygrometer
(See Heath - p. 321.)

Heath - p. 320-323.

Heath - p. 321-322.

Make hygrometer that changes color as humidity changes (blue in dry air, pink as humidity increases). Put several spoonfuls of cobalt chloride into basin, add warm water and stir until cobalt dissolves. Soak sheets of paper in the solution. Put them aside to dry on a plate or wax paper. Then cut the paper into interesting shapes. Watch them change color from day to day as the humidity changes.

Heath - p. 322-323.

Change of air pressure. Air pressure is the push, or force, of the air. Air has pressure because it has weight.

Turn a bottle of water upside down in a pan of water. Observe that the water does not empty from the bottle. Air is pressing upon surface of water in the pan. There are 15 pounds of air pressure on each square inch. This pressure is enough to hold up the water that is in the bottle.

Ginn - p. 51.

Heath - (4th Grade),
Science In Your Life,
p. 13-20.

Singer - p. 184-187.

When air pressure becomes greater, weather is usually clear or clearing and drier. When air pressure becomes less, the weather is usually becoming less settled and more moist.

Keep records of air pressure as measured by barometers. Note the relationship between pressure and weather.

Heath - p. 317.

(Grade V - Weather)

Problem 2: What kinds of barometers are there and how do they differ?

Concepts

Aneroid Barometer is very accurate. It has a large black pointer which moves as the weather changes.

Cape Cod Barometer is not as accurate as the aneroid. It is filled with red liquid which is colored water. If the water falls, usually the weather will be clear. If it rises, the weather will be cloudy or rainy in a day or so. It is called the teakettle barometer, Cape Cod barometer or swan-neck barometer.

Mercury Barometer is the most accurate type. Men and women who work out weather reports use these. It is a long glass tube, closed at the top, with its open end in a bottle of

Activities

Have a child bring in an aneroid barometer. Follow its readings. Note that usually, weather will be clearer in about 24 hours, if the pointer moves to right. If it moves to the left, weather will become cloudy with rain or snow. A second short pointer can be moved to the spot to mark the reading.

Make a barometer that works like the Cape Cod. Color a cupful of water by soaking a piece of colored crepe paper in water or by adding ink. Pour the water into a large bottle about an inch deep. Put a glass tube at least six inches longer than the bottle through a rubber stopper with a hole in it. Place this in the bottle firmly. Blow air into the tube until the water in the tube is about 2 inches above the stopper. On a white card, make a line 5 inches long, marked off every quarter of an inch. Number the marks from "0" on top to "20." Cut two slits in card and slip it over the tube. Keep the barometer in a part of the room where temperature is fairly even. With increased air pressure the colored liquid will press down in the tube.

Visit the weather station to see mercury barometer and other instruments.

Make a mercury barometer. Close a glass tube, 31 inches long, at one end. Fill it

Texts

Ginn - p. 50.

Heath - p. 318-320.

Ginn - p. 50.

Ginn - p. 51.

Heath - p. 317.

Singer - p. 186-187.

(Grade V - Weather)

(Problem 2 - continued)

Concepts

mercury. There is also mercury in the tube, but not quite to the top. When the weather is clearing and the air pressure is greater, it pushes the mercury higher into the tube. When weather is getting more moist, the air pressure is lighter and allows the mercury to move down a little way.

Activities

with mercury. Put your finger over the open end and turn it upside down in a dish of mercury. Prop a yardstick behind the tube and tie together so they will not fall. Now measure the height of the mercury.

Texts

Problem 3: What do we know about clouds?

Concepts

All clouds are not in the sky. You can make clouds with your breath on a cold day and can see them coming from a kettle of boiling water. Your breath is warmer than the air around you and has much water vapor on a cold morning. Winter air cools vapor and it becomes water vapor again. This is called condensation. When this occurs you can see a water cloud.

Activities

Observe cloud you breathe on cold day.

Watch kettle of boiling water produce small clouds.

Texts

Singer - p. 189.

Heath - (4th Grade),
Science In Your Life,
p. 21-24.

Make classroom cloud.

Put a cup of hot water into a milk bottle.

Lay an ice cube across the top of the bottle.

As the warm water evaporates, it will rise around the ice cube. The warm air, striking the cold area around the ice, will form a thin cloud.

Heath - (5th),
Teacher's Guide,
p. 116.

When clouds form out of doors the same thing occurs. When the temperature of the air is too low to hold all the water vapor, the vapor condenses and a great cloud forms.

(Grade V - Weather)

(Problem 3 - continued)

Concepts

Activities

Texts

There are many kinds of clouds. Cumulus clouds are fluffy, fat and white and are often seen on sunny days at any time of the year. These have flat bottoms and rounded tops and are very thin when opposite the sun.

See Filmstrip, "Clouds and Weather," Society for Visual Education.

Heath - p. 311-312.

Ginn - p. 56.

Cirrus clouds are fine white wispy clouds which float about three to six miles above your head and look somewhat like plumes made of feathers. They are seen at any time of the year and are so thin you can see the bright blue sky through them.

Ginn - p. 56.

Cirro-cumulus clouds are a combination of cumulus and cirrus. When these are in the sky we say there is a mackerel sky. Cirro cumulus clouds are high, white clouds that look something like ripples of sand on the seashore.

See Film "The Clouds Above," Bailey Films, Inc.

Films listed, p. 121, Heath - Teacher's Guide.

Stratus clouds are low, grayish clouds which cover the whole sky and look something like fog, but do not touch earth. Fine rain or drizzle might fall from these.

Ginn - p. 57.

Nimbo-stratus clouds are low dark gray, sheetlike clouds. Rain or snow may fall from these.

See Film "Clouds," United World Films, Inc.

Ginn - p. 57.

Cumulo-nimbus clouds are tall, heavy, dark clouds from which rain, snow or hail may fall. These clouds may also be thunderheads. They are flat at the bottom and their tops spread far out. These get darker as they are blown nearer to you.

Use finger-paints or water colors to make pictures of different clouds.

Ginn - p. 58.

Heath - Teacher's Guide, p. 116.

(Grade V - Weather)

(Problem 3 - continued)

Concepts

Tornado cloud is a dark, funnel-shaped cloud which accompanies a strong, twisting, whirling, destructive wind. This is caused by colder air moving warmer air very rapidly over a small area.

Clouds help us to predict the weather.

Activities

Make a cloud and weather chart, keeping a record at least one full week. Note the relationships between certain types of clouds and certain kinds of weather.

Text

Ginn - p. 58.
Heath - (6th Grade),
Science For Today
and Tomorrow, p. 310-311.

Ginn - p. 59.

Heath - p. 311-312.

Problem 4: What causes rain, snow, sleet, hail, dew, frost and thunder and lightning?

Concepts

Rain-clouds form when warm air with water vapor in it becomes cool. Air becomes so cool it cannot hold all its moisture; then water vapor condenses on particles of dust that are always in the air.

Activities

Make rain. Boil a kettle of water. Hold a cold cup over the end of the spout. Drops of water appear on the cup. When water vapor is cooled enough it becomes drops of water again. It has condensed.

Texts

Singer - p. 190-195.

Singer - p. 190.

Ginn - p. 40.

Heath (6th Grade)-
Science For Today
and Tomorrow,
p. 294-296.

The amount of rain that falls in a given time is measured by a rain gauge.

Make a rain gauge from any straight-sided jar or can. Leave it in the open until a rain has come and gone. Then dip a ruler into it and measure the rainfall.

Heath - p. 324-325.

Snow is formed in very cold clouds when the molecules in the water vapor come together and freeze quickly.

Heath (4th) -
p. 30.

Ginn - p. 42.

Singer - p. 190-191.

(Grade V - Weather)

(Problem 4 - continued)

Concepts

Sleet is frozen rain. Temperature in the layers of air is different. As water vapor falls to the earth as rain, it passes through below-freezing temperatures and freezes.

Hail is sleet that has been blown upward again and again, adding a layer of ice each time, until it is too heavy for the wind to hold up.

Dew is made of little drops of water that collect on cool things on the ground, from water vapor in the air.

Frost is frozen water vapor. When temperature is below freezing, and changes in it cause separation of water vapor and air, frost may form. It is not frozen dew.

Thunder and Lightning: Light- Rub a hard rubber pen on ning is frictional electricity wool or fur. Touch your which is generated by the swirl- finger quickly with the ing and rubbing of drops of pen. Do you see a small water vapor in the air and in spark? the clouds. As the charge passes through the air you see a flash - lightning. This flash of lightning heats the air, causing it to expand. The expanding, moving air makes a very quick, rushing movement called thunder.

Problem 5: How do weather stations know about conditions high up in the air?

Concepts

Balloons filled with hydrogen or helium gas are used. Observation through special

Activities

If you can get a hailstone, cut it in two. Notice the layers of ice and snow. Can you tell how many times it has risen and fallen?

Activities

Ask a weatherman to visit the class, and tell how balloons are used, or visit

Texts

Heath (4th) - p. 28.

Singer - p. 191.

Ginn - p. 40.

Heath (4th) - p. 28-29.

Singer - p. 191-192.

Ginn - p. 40-41.

Heath - p. 4-26.

Singer - p. 194-195.

Ginn - p. 41.

Singer - p. 195.

Ginn - p. 42.

Heath (6th Grade) Science For Today and Tomorrow, p. 307-309.

Ginn - p. 205.

Singer - p. 192-194.

Heath - p. 271-272.

Texts:

Heath - p. 325-326.

(Grade V - Weather)

(Problem 5 - continued)

Concepts

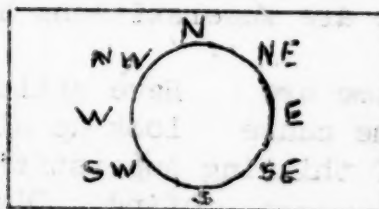
telescope can tell observer the direction and speed of the wind at each level of the earth.

Activities

the weather station and see them if possible.

Texts

Study high wind direction by using ready-made balloons in sky-clouds. Make a nephoscope. Place a round mirror on a larger piece of cardboard. Trace its outline with a pencil. Remove mirror and mark all of the directions.



Paste a little piece of gummed paper about the size of a dime in the center of circle. Set card on a level, and place outdoors with N mark pointing North. Place mirror on it, exactly fitting the circle you drew. When you see a cloud in mirror follow a curl of it, until it reaches the edge of the mirror. This is the direction toward which the wind is blowing. If it is blowing toward the West, it is coming from the East - an East wind.

A radiosonde is a small box containing weather instruments and a tiny radio transmitter. It automatically sends information of weather conditions high in the air to the weather station.

Heath - p. 326-327.

Radar. In some weather stations the location of a storm, its probable size, and the direction in which it is traveling is determined by means of radar.

See filmstrip, "Weather Bureau," Curriculum Films, Inc.

Heath - p. 327-328.

(Grade V - Weather)

Problem 6: How are weather reports used?

Concepts

Weather reports help in planning parties, the clothes to wear and trips.

They help in conducting business. For example, more cold drinks are sold on hot days.

Activities

Make list of all the ways weather reports have affected children, their families or friends.

Make a weather station for the class and issue daily weather reports.

Texts

Singer - p. 178-179.

Ginn - p. 45; 62.

Heath - p. 328-329.

Ginn - p. 46-55.

Problem 7: How true are superstitions about the weather?

Some are true and some are not. We must use the cause and effect method of thinking to judge each one.

Have children think of and look up all the weather superstitions they can find. Discuss a few, helping them to discover whether the cause and effect relationship applies.

Heath - p. 330-332.

Ginn - p. 60-61.

BEAUFORT WIND SCALE

Speed - MPH	Kind of Wind	What you see
0-5	Breeze	Leaves move
5-15	Light wind	Twigs move
15-25	Moderate	Small trees sway
25-35	Fresh	Blows flags and wind socks straight out.
35-50	Strong	Sways trees back and forth.
50-75	Gale	Breaks branches, knocks down signs.
Over 75	Hurricane	Uproots trees, damages buildings.

See Ginn - Adventures In Science, p. 49.

EVALUATION

A teacher-made test may be given at the completion of this unit. Of course the teacher will be evaluating all the time as the unit continues. She can judge its success by the interest of the children, the number of books they get on weather, and instruments they make and bring in on their own...in short, by their enthusiasm and participation.

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Climate. 40 frames. Jam Handy.

Climates. 46 frames. Young America.

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A Trip to the Weather Station. 42 frames. Young America.

(Grade V - Weather)

(Filmstrips - continued)

Weather. 46 frames. Young America.

What Is Weather. 37 frames. Jam Handy.

What Makes Rain. 40 frames. Young America.

What Makes The Weather. 38 frames. Jam Handy.

GRADE FIVE

DIGESTION

The purpose of this unit is to provide the opportunity for children to develop a better understanding of their bodily functions; to increase understanding of their own and others' difficulties in food allergies; and to develop good nutritional habits.

The problem: What are the processes of digestion?

Concepts

Activities

Texts

Every cell in your body is a tiny package of living material with a wrapping called a cell membrane.

Make microscope studies of food-cell construction (i.e. celery, onion, carrot) to show that a cell has several parts. Also, if possible, do studies of an ameoba.

(All are fifth-grade basic texts unless otherwise noted.)
Heath - p. 250; 252.
Heath (4th Grade) - Science In Your Life, p. 189-193.

School microscope.

Proper Food is a very necessary part of healthful living.

A white-rat experiment would be useful here.

Heath - p. 251.
Singer - p. 221.
Chart - Wheel of Good Eating.

Salivary glands help to start the process of digestion by starting the change of starch to sugar.

Chew a cracker slowly, testing the change of starch to sugar. -- Mix 1 tablespoon of starch and 1 cup water. Heat and cook until clear, stirring to prevent burning. Put 1 teaspoon of paste in each of two glasses. Add one teaspoon saliva to one glass. To the other glass add one teaspoon water. Put aside for one hour. Check. Note that glass with the saliva has dissolved the paste; the other has not.

Allyn and Bacon - p. 87.

Bread (film)

(Grade V - Digestion)

Concepts

Chewing is a very necessary part of the digestive process.

The body takes care of digesting the food automatically if not disturbed by emotion.

Food continues its digestion:

Meat, milk, fat are partly digested in stomach. All food is mixed and made liquid with addition of juices--food remains in stomach several hours.

When food goes into the small intestine, digestion of the food that can be digested is completed. Some food cannot be completely digested.

Activities

Drop a cube of sugar into a glass of warm water, shake it and time it to see how long it takes to dissolve. Again drop a cube of sugar into warm water, but do not shake. Check the time required for sugar to dissolve. Note it takes much longer. (This would be an excellent place to make a study of teeth if not done before.)

Through discussion of experiences, determine what effect exercise, fear, or other emotion will have on digestion.

Have each child make a chart or diagram showing the path of the digestion of food, thus familiarizing himself with the terms:

1. mouth
2. esophagus
3. stomach
4. small intestine
5. large intestine

With charts and pictures trace each kind of food in its breakdown, - fats and protein in the stomach and duodenum. Carbohydrates' breakdown starts in the mouth, continues in stomach and is finished quickly in duodenum. -- Discuss timing of meals, regularity, size and over-eating.

Charts and discussion. Microscopic studies again of structure of food cells -- some of which our bodies cannot digest. Compare digestion in man and animals. Note the

Texts

Heath - p. 254.
Film on Dental Care.

Heath - p. 252.

Singer - p. 222.
Film - Food Eating Manners.

Allyn and Bacon -
p. 88, 89.
Singer - p. 222,
223.
Heath - p. 254,
255.

Allyn and Bacon -
p. 89.
Singer - p. 222.

World Book Encyclopedia

Films

Heath - p. 254.

Allyn and Bacon -
p. 89.
Singer - p. 222.

Heath - p. 254.

Encyclopedia.

(Grade V - Digestion)

Concepts

Activities

Texts

ability of animals' bodies to digest foods that ours cannot.

To show that all foods are not dissolved--add several small pieces of carrots to a cup of water. Add 1 tablespoon of sugar to another cup. The sugar will dissolve; the carrots will not.

Muscles of the body keep food moving through the food tube.

Take a small plastic tube and partly fill with water. Fasten both ends with a rubber band. Squeeze the tube with fingers one at a time so that water will be pushed to the opposite end.

Food that is digested is carried through the walls of the intestine into the blood stream, and then to the body cells where it is used as energy.

Demonstrate osmosis by dipping. Take a small blotter and a bottle of ink.

Pick off the shell of the large end of an egg. Do not break lining. Make a hole through both lining and shell

Singer - p. 224.

Heath - p. 255-256.

of the small end of the same egg. Put a small glass tube through the whole (small end) and seal with paraffin. Part-

Heath (6th Grade) -
Science For Today and Tomorrow, p. 162.

ly fill a small jar with water. Put the egg at the bottom of the jar. (Do not cover all of egg). Note that the liquid will pass through the egg into the tube.

EVALUATION

A study of food is a never-ending process. It is hoped through a study of digestion that an improvement of a child's dietary habits may be noted.

(Grade V - Digestion)

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GRADE FIVE

CONSERVATION IN THE UNITED STATES

The purpose of this unit is to develop understanding of why we need to conserve our resources; to develop understanding of how they can be conserved, and to observe ways we are conserving them.

Problem 1: Why is the farmer concerned with conservation?

Concepts

In order to meet the demands of our increasing population, the best use of our available farmland must be made.

Soil testing guides the farmer in planting the proper crops.

Co-operation of farmers and scientists to meet this problem is necessary.

Rotation of crops and use of chemical fertilizers replace minerals in the soil.

Activities

Study the population increases in relation to our increasing life span. Find other reasons for population increases.

Test soil to see if it is acid or alkaline. Use two jars with lids. Put two different kinds of soil into the jars along with water. Shake and test the resulting water with litmus paper to see if it is either acid or alkaline. Find ways to neutralize one extreme or the other. Find which plants like an acid soil and which thrive in an alkaline soil.

Plant two identical planters with the same kind of seeds.

Use chemical fertilizers with one and none in the other. Watch progress as plants grow and note differences in size.

Compare types of soil found in forests with other soils to find the usefulness of leaves and twigs as fertilizer. Plan a visit to a farm.

Texts

Heath - Science In Our World, p. 128.

Heath - Science In Our World, p. 129-130.

Heath - Science For Today and Tomorrow, p. 119-122.

Singer - p. 296.

Heath - Science For Today and Tomorrow, p. 195-196.

(Grade V - Conservation In The United States)

Problem 2: How does water affect conservation?

Concepts

Wind, rain and snow cause the erosion of top soil.

Soil without cover loses as much as sixty tons of earth per acre per year.

Plants help to control the flow of water. Their roots protect the soil.

Contour plowing helps to conserve soil.

Activities

Take a field trip to a nearby place where erosion has taken place. Note the difference between this place and any surrounding area that has vegetation.

Observe on a small scale in the room what water can do running over a small amount of soil. Note the grooves and ruts the water makes.

Discuss erosion around the children's homes, on lawns, drives and streets.

Experiment with a piece of sod and a similar piece of soil. With a sprinkling can simulate rain. Observe how much soil is washed away from the plain soil. Note how little is washed away from the sod. (See p. 140-141, Heath.)

Use the same experiment, but instead of sod use soil covered with fallen leaves and twigs. Observe results.

Make a small model of a hill with plowing going around the hill. Plant vegetation and use sprinkling can for rain. Note whether or not there is any erosion.

Texts

Heath - Science In Our World, p. 138-139.

Ginn - p. 190-195.
Allyn and Bacon - p. 50-61.

Singer - p. 294-307.
Craig-Hill - p. 190-191; 196-198.
Singer - p. 296.
World Book - Volume 3, Conservation.

Heath - Science In Our World, p. 139-145.

Singer - p. 298-300.
Ginn - p. 198.

Craig - Hill - p. 197-198.
Heath - Science For Today and Tomorrow, p. 24-244.

(Grade V - Conservation In The United States)

(Problem 2 - continued)

Concepts

Activities

Texts

Dams conserve water and land.

Irrigation conserves water and benefits gardens.

Levees protect the land and people.

Find pictures of different countries and notice how they make use of contour plowing.

Make models of a dam to show how it works.
Use with social studies when studying about irrigation, lumbering and places where dams have been built to protect the people and the land.
Take a trip to Muskingum Water Conservancy District.

Have reports to show how dams can conserve water and protect the land.

Find pictures of flood damage.

Build a clay model of a levee.

Report why a city like New Orleans would need protection when the Mississippi River is at flood level.

Heath - Science In Our World, p. 147-152.

Heath - Science For Today and Tomorrow, p. 243.

Ginn - p. 199-200.

Heath - Science In Our World, p. 150-151.

Craig-Hill - p. 199-200.

Heath - Science In Our World, p. 152-157.

Heath - Science In Our World, p. 152-157.

Craig-Hill.

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(Grade V - Conservation In The United States)

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GRADE SIX

THE UNIVERSE

The aim of this unit is to give children a better understanding of the universe: to help them learn of the beauty and mystery of it, to feel awe and wonder at its magnificent orderliness.

This unit should help children develop: appreciation of the extent and wonders of the universe, the value of the sun and our dependence upon it for existence, appreciation of the contributions astronomers have made to our scientific world, and to create an interest in discoveries and experiments of today.

Problem 1: How did people discover that there are changes in the universe, and that they follow an orderly pattern?

Concepts

By studying the sky for thousands of years, sky watchers have been able to tell the coming of the seasons by the position of the sun and stars. This has helped farmers plant crops at the right time.

The sun's position which changes from day to day, repeats the pattern year after year.

The stars, the moon and the planets all have a repeating pattern in their apparent movements through the year.

The sky watchers of long ago marked off the first day of each season, counted the days in between and thus formed calendars of various kinds.

Activities

Ask a volunteer to find and read a story on the sun god as told by one of the Indian tribes of our country.

Read legends, about the sun, moon and planets. Try to think why ancient people believed these legends to be true.

Let children measure the length of their shadows at three or four different times during the day. This is best done out of doors, and it is helpful if a record is kept and the activity is repeated two or three times a year, so the children will notice the seasonal differences.

If some pupil has a sundial at home, have him watch for the sun's shadows and check at the same time each day.

Ask for volunteers to find

Texts

Heath - Science For Today and Tomorrow, p. 248-259.

Heath - Science For Today and Tomorrow, p. 251 (experiment to show shadows).

Allyn and Bacon - Exploring Science, p. 54-55.

Singer - How and Why Discoveries, p. 140-143.

(Grade VI - The Universe)

(Problem 1 - continued)

Concepts

Activities

Texts

out some method of keeping time before the invention of modern clocks.

Make a chart or scrapbook of 'Timekeeping Now and Then'.

Locate time zones on individual outline maps of the United States.

Problem 2: Who are astronomers, and what tools do they use?

Concepts

Activities

Texts

Astronomers are scientists who study the stars and planets to find what they are made of and how they move and change.

Find out what each of these scientists contributed to our knowledge of the universe: Kepler, Galileo, Herschel and Lowell.

Heath - Science For Today and Tomorrow, p. 253-254.

Singer - How and Why Discoveries, p. 124-127.

The facts of astronomy are hard to believe because they deal with faraway things that we cannot touch and explore.

The telescope is the chief instrument of the astronomer.

A refracting telescope consists of a long tube with glass lens or several lenses at each end. These lenses have different magnifying power. Together they enlarge the image of a distant object.

Build a refracting telescope. Take two magnifying lenses and a piece of corrugated paper. The paper should be about two inches longer than the distance between the lenses. Make a tube of the paper and fit the largest lens near the end of the tube. Fasten the edges of the paper with scotch tape.

Wrap another piece of corrugated paper around the smaller lens often enough to make a shorter tube. Fasten this. If the lens

(Grade VI - The Universe)

(Problem 2 - continued)

Concepts

A reflecting telescope has a large round, mirror which reflects the light of distant objects.

Astronomers use the telescope as a camera lense to take pictures of stars on photographic film.

A film can see more than the human eye, because the film soaks up light. The longer the exposure, the brighter the picture. A time-exposure photograph through a telescope shows many more stars than we can see with the eye.

With the help of special instruments, astronomers can measure the temperature of many distant bodies.

When a substance is heated enough, it glows. It changes color as the temperature rises.

Scientists can estimate the temperature of glowing stars from the color of the starlight as seen through a telescope.

Activities

has a handle, cut a slot in the paper.

Next slip the second paper tube inside the first tube and adjust the two lenses so you have the correct distance between them. Your telescope is now ready for use.

Try the experiments on pages 268, 270, and 272 of -----

Have pupils give reports on the following: Important Telescopes in the United States, Astrology, Spectroscope, and the Polmar Telescope.

Darken the room and hold a hand lens in the path of a beam of light coming into the room through a hole in the shade. Shake some chalk dust in the light, and the crossing of the rays will be visible.

Use an iron nail, pliers, and a gas flame. Watch the change of color as the temperature rises. First, the nail is the natural blue-gray color, then as it gets hot, it becomes a very dull red, then brighter red and finally, orange and yellow. If you could heat the nail hot enough, it would change still further to white and blue-white.

Texts

Heath - Science for Today and Tomorrow.

Teacher's Manual for How and Why Discoveries.

(Grade VI - The Universe)

(Problem 2 - continued)

Concepts

Activities

Texts

Experiment with glass prisms, also with a mirror and a glass of water, to observe a spectrum of light. If you do not have an optical prism to break up light, use the crystal prism from an antique hanging lamp.

If there is an aquarium in your room, sun shining through the corner of it often breaks up the light.

Scientists can measure the distance to various planets by sighting them from opposite places on the earth.

Try the experiment on pages 274-276 in Science For Today and Tomorrow.

Heath - Science For Today and Tomorrow, p. 274-277.

Allyn and Bacon - Exploring Science, p. 71.

Problem 3. What gives us day and night and the changing seasons?

Concepts

Activities

Texts

The earth rotates on its axis. At the same time it travels around the sun. These two motions, bring night and day and the changing seasons.

Let a small group of pupils work out the experiment on page 254-55. Let them show their findings to the class and explain them.

Heath - Science For Today and Tomorrow, p. 254-257.

If pupils are confused about the two movements of the earth, mark a large circle, with chalk, on the floor. Let one pupil stand in the center of the circle. He represents the earth. He will move around the circle slowly revolving as he does so.

Singer - How and Why Discoveries, p. 90-94.

Because peoples' five senses give them no indication that the earth is moving, it was formerly believed that the earth was motionless and everything else revolved around it.

Allyn and Bacon - Exploring Science, p. 56-71.

When observation showed that the facts did not fit the ideas that people had

Spin a coin on the table. It will move along as it rotates.

(Grade VI - The Universe)

(Problem 3 - continued)

Concepts

of the circling path of the sun, moon and stars, people began to look for other explanations.

The sun's position, which changes from day to day, repeats the pattern year after year.

Activities

Demonstrate with a top to show how the earth spins on its axis.

With a globe and a flashlight, show how the earth is tilted on its axis as it revolves around the sun, causing a change in seasons. Also show how the Northern and Southern Hemispheres have opposite seasons.

Using the globe and a flashlight, show how the sun shines on the earth causing night and day.

Texts

Problem 4: What causes eclipses?

Concepts

The moon does not follow the regular motion of the stars. It seems to lag behind and even is visible in the daytime.

The moon revolves around the earth.

Occasionally the moon crosses between the sun and the earth. This casts a shadow on the earth. Such a shadow is called a solar eclipse.

When the earth gets between the sun and the moon it casts a shadow on the moon. Such a shadow is called a lunar eclipse.

Astronomers have calculated the solar and lunar eclipse for thousands of years to come.

Activities

Look at the moon through field glasses. Go out doors when the moon is visible in the daytime and observe how the lighted side is toward the sun.

With a globe, a light, and a basketball, show the motions of the moon during a solar eclipse, and a lunar eclipse.

Stand in the light and hold the ball at arms length.

The ball represents the moon, and your head represents the earth. Move the ball around your head (the earth) and notice the various amounts that appear to be lighted. Be sure to hold the ball above the

Texts

Heath - Science For Today and Tomorrow, p. 256-257.

Heath - Science For Today and Tomorrow, p. 276-277.

Singer - How And Why Discoveries, p. 126-127.

Teacher's Manual - How and Why Discoveries, p. 88.

(Grade VI - The Universe)

(Problem 4 - continued)

Concepts

Activities

Texts

head. The teacher should demonstrate this procedure first, then if possible, let each child experience it.

Remind the pupils that the moon's light comes from the sun; that the moon is ball shaped and can be lighted only on one side; and that the moon revolves around the earth once every month.

Take advantage of any eclipse which may occur, to help the pupils clarify the concepts.

Refer to the pictures at the bottom of page 257 in Science For Today and Tomorrow.

Problem 5: What makes up the solar system?

Concepts

Activities

Texts

The solar system is made up of the sun and the planets that revolve around it. The earth is one of the planets.

Planets are heavenly bodies, like the earth, which have their own paths or orbits around the sun.

The stars are not part of the solar system. They are very far away.

Make models of the planets. This can be done with balloons and rubber balls covered with paper maché. When dry, they can be colored with tempera paints.

Use a ring cut out of cardboard. Attach to the model of Saturn with a clothes hanger inserted through the center. Paint the different colored rings on it.

These models can be strung from the ceiling or be placed on a mobile. Label each one of them.

Pupils can get figures that tell distances and diameters

Heath - Science For Today and Tomorrow, p. 259-260.

Singer - How and Why Discoveries, p. 90-105.

(Grade VI - The Universe)

(Problem 5 - continued)

Concepts

Activities

Texts

of the various planets. Decide on a scale that they can use to get all of the planets and members of the solar system into the classroom, with the sun, the largest body, and Mercury, the smallest body.

This is a good project in making science and mathematics useful to one another.

Draw sections of the orbits of planets on a long (about 25 feet) sheet of wrapping paper. Use six inches to represent the distance of the earth from the sun and locate the others to this scale, with a distance of approximately 20 feet for Pluto.

The planets circle around the sun at different speeds. When a planet is nearer to us, it looks larger and brighter. When it is farther away, it looks smaller and dimmer.

Let children perform the experiment on page 261.

The table on page 263 may be used to get the size of each planet. Circles can be drawn or cut according to those sizes.

There is a chart on page 262-263.

Heath - Science For Today and Tomorrow.

Heath - Science For Today and Tomorrow.

Heath - Science For Today and Tomorrow.

The planet nearest to the sun is millions of miles away.

Tiny asteroids or planets travel around the sun between Mars and Jupiter. They travel in an orbit.

Heath - Science For Today and Tomorrow,
page 277.

(Grade VI - The Universe)

Problem 6: What are meteors and comets? How do they affect the earth?

Concepts

Bits of rock or metal in the sky are called meteors or shooting stars.

When meteors fall toward the earth, their speed is so great that they become heated to a brilliant glow by friction with the air.

Large meteors which reach the earth without bursting are called meteorites.

Comets look like glowing balls with long fiery tails. Their orbits around the sun are long and narrow.

Activities

If possible, borrow a meteorite from a local, state, or college museum. Children get a wonderful experience from holding an object from outer space in their hands.

Pictures may be obtained from the Hayden Planetarium in New York City.

Encourage pupils to watch the evening sky to see meteors. If they see any, encourage them to describe what they saw.

Texts

Heath - Science For Today and Tomorrow, p. 278.

Singer - How and Why Discoveries, p. 133-139.

Teacher's Manual for How and Why Discoveries, p. 90.

Problem 7: What is a galaxy? What is the Milky Way?

Concepts

The home of the solar system is in a huge cluster of stars called the galaxy.

Our solar system is much nearer to the rim than it is to the center of our galaxy.

Activities

Cut the bottom out of a round cereal carton, such as used to package oatmeal. Cut a hole in the cover through which a flashlight may be inserted. In a cardboard cut to fit the bottom of the carton, punch holes, showing the stars in the constellation. A separate cardboard will be needed for each constellation. Darken the room, and turn on the flashlight to see the constellation. Each pupil may want to make a picture of the constellation and tell a story about it.

Texts

Heath - Science For Today and Tomorrow, p. 279-282.

Singer - How and Why Discoveries, p. 86-105.

(Grade VI - The Universe)

(Problem 7 - continued)

Concepts

The rim of our galaxy, which looks like a long thin cloud in the sky is called the Milky Way.

There are millions of galaxies besides ours.

Most galaxies are so far away that a whole galaxy looks like a single fuzzy star.

Because the sky distances are so great, astronomers have chosen the light-year, which is a much larger unit of measuring than the mile.

A light year is the distance that light travels in one year.

Activities

Make star maps, these may be begun by drawing the Big Dipper and the North Star and then adding the polar star groups (the Little Dipper, Cassiopeia and Draco) in their relative positions. Each pupil may make his own map, or a map may be worked out on the blackboard and then drawn on a stencil and mimeographed.

The inside of an umbrella is a good background for showing star groups. The handle may represent the axis of the earth. When it is pointed toward the North Star it helps pupils to locate the star groups in the North.

Remove one end of a covered cardboard box. Cut several pieces of paper the size of the end of the box, and on each piece, make one constellation by punching holes to represent the stars. Use an electric light on an extension cord for illuminating the inside of the box. Darken the room for this.

Visit a planetarium if possible.

SUGGESTED ACTIVITIES

1. Have children read from different sources to find answers to specific questions.
2. Have each child keep a list of new words learned.
3. Have each child keep a spelling list.
4. Have children write stories about the best-known constellations.
5. Locate the solar system in the Milky Way galaxy.
6. Take imaginary trips to the planets as you study about them.

(Grade VI - The Universe)

ART ACTIVITIES

1. Have children model the surface of the moon. Use self-hardening clay to depict the valleys and moon craters, then paint them with tempera paints.
2. Construct a 3-D diorama of the solar system. Use rubber balls and marbles in correct proportion for the sun and planets. Use tempera paints to paint models and background.
3. Have a committee cut openings, paint and prepare a cardboard carton for a simulated television show.
4. For use in the television show, have the children do the following:
 - a. Draw and paint pictures of comets, meteors, star clusters and Milky Way galaxy.
 - b. Paint pictures of the best-known constellations.
 - c. Create pictures of imaginary trips to the moon, showing the different reasons why an ordinary man could not live there.
 - d. Draw pictures to show that we get heat, light, color and food from the sun.
 - e. Create pictures of how all life depends upon the sun.
 - f. Draw pictures illustrating the four seasons.
 - g. Make illustrations of the solar system and the direct and indirect rays of the sun.
 - h. Create pictures of what children living in the four time zones might be doing at this precise moment.
5. Have a committee write all reports in manuscript.
6. Have another committee organize and assemble pictures and stories for the television show.
7. Write invitations to other classes to the television show.
8. Play the record, "By Rockets to the Moon." Write songs and poems about space.

CULMINATION

Present a simulated television show to the children of the other grades in the school.

In preparing for this show, committees can be selected to work on various phases such as:

1. Organization of material
2. The order in which material is to be presented
3. Script for those who are to present the show.

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(Grade VI - The Universe)

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(Grade VI - The Universe)

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MATERIALS AND EQUIPMENT NEEDED

sheet of cardboard
spools
pencil
pin
alarm clock
electric light
rubber balls
3 magnifying glasses of different magnifying powers
scotch tape
piece of corrugated paper
magnifying mirror
camera
roll of film
thermometer with colored liquid
iron nail
pliers
tank or alcohol burner
12 feet of string
cardboard box
soda straw
clothes hanger
balloons
tempera paints
newspaper for paper maché
paste
modeling clay
top
globe
flashlight
cardboard carton
shoe boxes
marbles
binoculars
25 feet of wrapping paper
prism

Children will bring in many of these things. Cardboard and corrugated paper may be obtained by asking at a department or furniture store.

GRADE SIX

ELECTRICITY AND MAGNETISM

The purpose of this unit is to develop understanding of the earth as a huge magnet, and that the north and south poles of compass needles are attracted by its magnetic poles.

It should help them develop understanding of the relation of electrical energy to magnetism; that a current of electrical energy can produce the same effect as a magnet. It should help them understand how electricity is generated, of its importance in our daily lives, and how we use and control electricity.

Problem 1: What is magnetism? Is the earth magnetic? What is magnetite?

ConceptsActivitiesTexts

Long ago people found that a certain type rock sometimes attracted iron. The name given to this rock was magnetite. When a piece of magnetite acts as a natural magnet, it is called lodestone.

Make a compass with a bar magnet as the needle.
Tie a bar magnet to a long piece of string so that it will be able to swing freely.
Mark N, S, E, and W on a circular piece of paper and orient the north pole of the magnet with "N" on the paper.
Move an iron nail around the outside of a compass and notice the effect of iron upon the compass needle.

Ginn - Grade 6,
Experimenting In Science, p. 189-190.

Scientists have found that the magnetic force on the earth's surface seems to be concentrated in two different locations, or poles. A magnetic pole and geographical pole are different things.

Point out on world map the Prince of Wales Island, the location of the magnetic North Pole. Point out the North Pole. Locate the magnetic South Pole in Antarctica. Point out the South Pole.

Ginn - Grade 6,
Experimenting In Science, p. 195-196.

There are two theories of magnetism. According to the molecular theory, all things are made of millions of tiny particles called molecules. In turn, the molecules are made up of

Break magnet in two.
Two new magnets are made.
The south poles are at one side of the break; and the north poles at the other side.

Ginn - Grade 6,
Experimenting In Science, p. 197-199.

(Grade VI- Electricity and Magnetism)

(Problem 1 - continued)

Concepts

smaller particles called atoms. The scientists who developed the molecular theory of magnetism said that each iron molecule was a very tiny bar magnet.

The other theory of magnetism is called the electron theory. Scientists know that each atom of substance has many electrons spinning and rotating about its center. In most substances, these electrons are rotating in different directions. According to this theory scientists believe that all the electrons in a magnetized piece of iron are rotating in the same direction. This is the electronic theory of magnetism.

A current of electrical energy can produce the same effect as a magnet.

Activities

You will need an iron nail and a bar magnet. Start at the head of the nail and rub one end of the magnet along the length of the nail. When you have completed the stroke, lift the magnet from the nail. Then start again, stroking the nail with the same end of the magnet. You will stroke in one direction only.

After about thirty strokes, you will find the nail has become a magnet. You should be able to pick up a paper clip with your magnetized nail.

Make a drawing of an atom of iron. Show clockwise and counterclockwise spinning electrons. An atom of iron has 26 spinning electrons.

You will need a compass, a piece of copper wire, and a dry cell. Run the copper wire directly over the top of the compass needle and notice the effect of electricity upon the direction of the compass needle. The needle now points across the wire. Now use a bar magnet and bring its north pole to the compass from the west. The compass needle will swing to the east. The important point is this: A current of electricity can produce the same effect as a magnet.

Texts

Ginn - Grade 6,
Experimenting In
Science, p. 202-203.

Ginn - Grade 6,
Experimenting In
Science, p. 200-201.

Heath - Grade 6,
Science For Today
and Tomorrow,
p. 65-66.

• (Grade VI - Electricity and Magnetism)

Problem 2: How does the earth's magnetism and its magnetic field effect magnets?

Concepts

If a magnet is free to swing, it will point toward the magnetic pole and also along the lines of force around the earth's surface.

Activities

Hold end of nail near the N pole of the compass needle. Do same with the other end. Now hold nail in N-S direction tilted toward the ground, as you see in the picture. Strike head of nail several times. Then bring other end of nail near the N pole of the compass needle. If your experiment has been successful, the needle will move away from this end of the nail. The nail has become magnetized by striking it as it is held in the earth's magnetic field.

Your class might invite an airplane pilot to your classroom to tell how he uses a compass.

Show that the earth's magnetic field is slanted where you live.

You will need a steel knitting needle, a cork, two darning needles, and two drinking glasses. Put the knitting needle through the center of the cork. Stick the point of one darning needle into the side of the cork. Put it exactly in line with the knitting needle. Do the same with the other knitting needle, on the opposite side of the cork. Rest the darning needles on the edges of the two glasses so that the cork is suspended between them, and the knitting needle is pointing toward the north. Now adjust the knitting

Texts

Ginn - Grade 6,
Experimenting In
Science, p. 210-211.

(Grade VI - Electricity and Magnetism)

(Problem 2 - continued)

Concepts

Activities

Texts

needle in the cork so that it balances in a horizontal position. To magnetize knitting needle, use the south pole of a bar magnet. First, pick up cork carefully. Do not disturb the position of the needles in the cork. Now stroke the knitting needle in one direction with the magnet. When needle has become magnetized, test it to see which end has become N pole. The N pole of the magnetized needle will be the end which repels the N pole of the compass needle. Now replace darning needles on the glasses, so that N pole of magnetized needle points north. If you have replaced it carefully, the N pole of the knitting needle will point toward the earth. This will show you how much the magnetic field dips where you live.

Problem 3: What is an electromagnet?

Concepts

Activities

Texts

A coil of wire becomes an electromagnet when electricity flows through it.

Make an electromagnet. Wind insulated wire on a large nail. Twenty turns of wire will make a good magnet. It is well to use a switch when you connect the electromagnet to a dry cell. A dry cell lasts longer if electricity flows only when needed.

Pick up nails with the magnet. Try to pick up pieces of copper, wood, rubber, et cetera. What will the electromagnet pick up?

Thurber - Grade 6, Exploring Science, p. 182 - 183.

Singer - Grade 6, How And Why Discoveries, p. 301-302.

(Grade VI - Electricity and Magnetism)

(Problem 3 - continued)

Concepts

The poles of an electromagnet are related to the direction of the flow of electricity.

Activities

Lay an electromagnet on the table. Place a compass about an inch from the head of the nail. Press on the switch to make the electricity flow. If the N-pole of the compass turns toward the head of the nail, the nail is an S-pole. If the S-pole of the compass turns toward the head of the nail, the head of the nail is an N-pole. Place the compass about an inch from the point of the nail. Press the switch. Again observe the compass.

Texts

Thurber - Grade 6, Exploring Science, p. 186-187.

Heath - Grade 5, Science In Our World, p. 300.

You can change strength of electromagnet by increasing the amount of electricity, or by increasing the number of turns of wire.

Wind forty turns of wire on a large nail. Wire 20 turns on another large nail. Compare strength of the two electromagnets.

Thurber - Grade 6, Exploring Science, p. 184-185.

Singer - Grade 6, How And Why Discoveries, p. 302.

Connect electromagnet to one dry cell. Then connect it to two dry cells. Compare strengths.

Problem 4: What happens when direction of electricity is changed in an electromagnet?

Concepts

When you reverse flow of electricity you reverse the poles.

Activities

Place a compass about an inch from one end of an electromagnet. Touch the wires to the binding posts of a dry cell. Notice which way the compass points. Mark the poles of the electromagnet. Now change wire so that each touches the other binding post. This makes electricity flow in the other direction. Which way is it pointing? What has happened to poles of electromagnet?

Texts

Thurber - Grade 6, Exploring Science, p. 186-187.

(Grade VI - Electricity and Magnetism)

(Problem 4 - continued)

Concepts

Electromagnets are used in many machines.

Activities

Making a crane.

You will need a board for the bottom of the crane, a block of wood, some long thin pieces of wood, a dry cell and some insulated wire. Nail the block in the center of the board. Use a long piece of wood for the mast. Nail it to the end of the block and drive another nail up through the bottom board into the mast. Cut two pieces of metal from a tin can and shape them as shown in the picture. (Thurber, p. 189). Punch three holes in each one. Fasten each to the mast with two screws. The second long piece of wood will be the boom. Fasten it with screws to the pieces of metal. The pieces of metal act as a hinge for the boom. The lever is made of wood and is screwed to the block. It raises and lowers the boom.

A string goes through the screw eyes from the lever over the top of the mast to the boom. The dry cell is held in place by a strip of metal cut from a tin can. Put two washers on a stove bolt. Wind many turns of wire between the washers. This is the electromagnet. Wrap a short piece of wire under the nut of the stove bolt and twist wire into a loop. Fasten a string from the loop to a screw eye in the end of a boom. One wire of the electromagnet

Texts

Thurber - Grade 6,
Exploring Science,
p. 188-197.

Heath - Grade 5,
Science In Our World,
p. 301.

Singer - Grade 6,
How And Why Discover-
ies, p. 303-310.

(Grade VI - Electricity and Magnetism)

(Problem 4 - continued)

Concepts

Activities

Texts

goes to the dry cell. The other goes to the switch. A short wire goes from the switch to the dry cell. Push lever forward to lower electromagnet into pile of nails. The press switch and pull back on lever. The magnet will lift some nails. Open switch to drop nails.

Making a telegraph.

The sounder has two electromagnets. They are wound on nails driven into a block of wood. The moving part of the sounder is a strip of steel. You can cut this from a tin can. The sounder makes a click when the steel strip is pulled down by the electromagnets. Drive a nail just in front of the steel strip. There will be another click when the strip springs up and hits the nail head. Since most youngsters have made an electric bell and buzzer in the fifth grade, we will not list it as an activity.

Problem 5: How is electricity useful, and how can it be made?

Concepts

Activities

Texts

In this country electricity plays an important part in almost everything we use, in almost every home and factory.

Have class list uses of electricity in their daily lives.

Heath - Grade 5,
Science In Our World, p. 266.

Singer - Grade 6,
How And Why Discoveries, p. 318.

Great electric generators in powerhouses send electricity into home and factory.

A dry cell can send out electricity. It can light a little bulb. It can ring

Heath - Grade 5,
Science In Our World, p. 267.

(Grade VI - Electricity and Magnetism)

(Problem 5 - continued)

Concepts

Activities

Texts

A small amount of electricity can be obtained from a dry cell.

Electricity is made up of tiny things called electrons. Electrons are everywhere and in everything. They move when they are crowded.

When electrons pile up on one another as they stay still they are called static electricity.

When too many of them become piled up, they move and we have static electricity.

In lightning, huge amounts of electrons are piled up by the rubbing of drops of water vapor in the air and in the clouds. When electrons are overcrowded, they flow off. We then have lightning and thunder.

a bell. Attach insulated wire to each post of a dry cell and to the bulb or bell. The electricity flows from dry cell and lights the bulb, or rings the bell.

Static Electricity.
Darken room and stand in front of mirror. Comb your hair briskly. If your hair is dry, you will see little flashes of light and hear little crackling sounds.

Walk back and forth, across a woolen rug. Touch a metal doorknob. A spark of electricity jumps from your finger.

Get a roll of electrician's tape. Take it into a dark room or closet. Pull away the end of the tape with a quick, strong tug. You will see a flash of light made by electricity.

Comb hair. You rub electrons from hair to comb. As you keep combing, you keep piling electrons on the comb. When the comb is overcrowded, the electrons flow back to your hair. This flowing of electricity is called an electric current.

Compare this to what happens in the skies with lightning and thunder.

Have a student report on Ben Franklin and his kite.

Heath - Grade 5,
Science In Our
World, p. 268-273.

Singer - Grade 6,
How And Why Discover-
ies, p. 310.

(Grade VI - Electricity and Magnetism)

(Problem 5 - continued)

Concepts

Activities

Texts

A machine that makes an electric current by whirling a magnet around very fast is called a generator.

A generator has two parts - a magnet with a coil of wire around it.

Have youngster that has a bicycle lamp bring it to school and demonstrate to class how it works. Another youngster could illustrate this on the board.

Heath - Grade 5, Science In Our World, p. 273.

Heath - Grade 5, Science In Our World, p. 274.

Singer - Grade 6, How And Why Discoveries, p. 316-317.

In huge electric generators, there is a big, heavy special magnet called an electromagnet. A water turbine, a steam turbine, and other types of engines are used to whirl these electromagnets.

Have a pupil give an illustrated report showing the parts of a generator and explaining the work.

Heath, Grade 5, Science In Our World, p. 275-276.

Take a trip to Gorge Power-house as a class project.

An electric current may be made by use of chemicals. However, they soon lose their power.

Have a student bring flashlight to school and explain how it works.

Heath - Grade 5, Science In Our World, p. 277-279.

A solar battery gives off a little electricity when light shines on it.

Have a pupil give a report on solar batteries and light meter.

Singer, Grade 6, How And Why Discoveries, p. 312.

Heath - Grade 5, Science In Our World, p. 280.

Heath - Grade 6, Science For Today And Tomorrow, p. 349-350.

Problem 6: How do we use electricity? What is a circuit? a switch or outlet? a conductor? insulation?

Concepts

Activities

Texts

Two wires are needed for an electric current to flow. One wire must come from source of current to the electrical device, and

You will need a dry cell, a light bulb, and two pieces of wire at least one foot long. Scrape an inch of covering off each end of

Heath - Grade 5, Science In Our World, p. 283-284.

Singer - Grade 6, How And Why Discoveries, p. 304-307.

(Grade VI - Electricity and Magnetism)

(Problem 6 - continued)

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
another wire must go back to source. A complete roadway is called a complete circuit.	both wires. Bend each end into a little hook. Join one wire to the socket and to the dry cell. The bulb will not light. Now connect both wires. The bulb will now light.	Heath - Grade 5, <u>Science In Our World</u> , p. 283-284. Singer - Grade 6, <u>How Any Why Discoveries</u> , p. 304-307.
A switch is used to break path of an electric circuit. A switch can complete or break a circuit. There are many types of switches.	Follow above experiment. Then add a knife switch to circuit.	Heath - Grade 5, <u>Science In Our World</u> , p. 285.
Materials through which an electric current flows well are called good conductors of electricity. Materials through which electricity does not flow well are called poor conductors. Insulation is made of material that is a poor conductor.	You will need a board, a dry cell, a small light bulb and socket, two carpet tacks, and a few feet of copper wire. Fasten the bulb and socket to the board. Then connect a wire from one of the screws of the dry cell to the socket. Fasten another wire to the other screw on the dry cell, and a short wire to the socket. Be sure that the covering is scraped from the end of each wire before you use it. The two loose ends are wrapped around the thumbtacks. The thumbtacks are then pushed firmly into the board. Now you can test your conductors.	Heath - Grade 5, <u>Science In Our World</u> , p. 286 - 288.
	Lay a piece of copper across the tacks to complete the circuit. Copper is a good conductor. Then try other materials.	
	Bring in electric cords. Check for kinds of insulation used.	

(Grade VI - Electricity and Magnetism)

Problem 7: How is electricity used to produce heat and light?

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Each heating appliance contains a heating element. This element is made of a metal that has a high melting point. One such metal is nichrome.	Get a piece of lamp cord, and cut away the insulation. Pull out a thin strand of wire about six inches long. Hold the strand at each end and place it across the two posts of the dry cell. The wire will become hot. Make a list of electrical appliances that produce heat.	Heath - Grade 5, <u>Science In Our World</u> , p. 283-295.
Hot material gives off light. Carbon was used in first bulbs. Tungsten is used in modern bulbs. Tungsten also gives off heat which is wasted.	Have special reports on Thomas Edison. Film is available on Edison. You can examine the tungsten filament on a wornout bulb. Teacher must do this carefully.	Heath - Grade 5, <u>Science In Our World</u> , p. 295-297.
When electric current flows through certain gases in a fluorescent tube the gas gives off a faint, bluish light. When this light strikes against the material with which the inside of the tube is painted, a strong clear light is given off. Fluorescent lights give more light and less heat.		Heath - Grade 5, <u>Science In Our World</u> , p. 298-299.

Problem 8: How is electricity used as power? How is it controlled?

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Many electrical devices which have moving parts are worked by electromagnets.	Attach electric doorbell to a dry cell. Trace the path of the current through the switch and electromagnets.	Heath - Grade 5, <u>Science In Our World</u> , p. 299-305.
In an electric gong, an electromagnet pulls a piece of iron back and forth, striking the bell.	Try to examine an electric clock motor. If clock is not available make a cardboard model. Illustrate how motor works.	

(Grade VI - Electricity and Magnetism)

(Problem 8 - continued)

Concepts

Activities

Texts

In an electric motor an electromagnet causes rotary motion.

When insulation wears away, the two wires may touch, and most of the electric current will flow through the shorter path. This short path is called a short circuit.

The wires in a short circuit can become very warm. This may result in fire.

Fuses are a protection against fires in case of short circuits. Fuses are of many shapes and materials. When two bare wires come together and make a short circuit, the fuse melts and breaks the circuit.

You will need a dry cell, a small light bulb, a socket, and two pieces of insulated wire. Scrape some insulation from the middle part of each wire. Connect a dry cell and lamp. Now with a pencil, push the two bare spots together so that they touch for a second. You will find that the light goes out when the wires touch. The flow of electricity will be through the short and easy path. It will by-pass the lamp. This is called a short circuit. Short circuits produce heat, and that could cause fire.

You can make a fuse. Cut off a piece of tinsel about two inches long. Now connect the circuit as shown in picture in the Heath text. With thumbtacks fasten wire to board. Make sure that the thumbtacks hold the wires firmly against the tinsel fuse. The lamp should light.

Now make a short circuit. Holding each wire by its insulation, bring the two bare spots together so that they touch. Hold them that way and watch the fuse. You will see it heat up and melt at the center. When a fuse melts, it breaks the circuit. Now there is no longer any current flowing. The fuse has been destroyed, but the wires have been protected.

Heath - Grade 5,
Science In Our World,
p. 289-291.

Singer - Grade 6,
How And Why Discoveries, p. 314-315.

Heath - Grade 5,
Science In Our World,
p. 291-292.

(Grade VI - Electricity and Magnetism)

Problem 9: What is alternating current? direct current?

Concepts

Alternating current changes its direction rapidly.

Direct current flows steadily in one direction.

Activities

Have pupils show by movements of their hands, the series of starts and stops which would be made by the flow of alternating current. Then the children can demonstrate the different movement made by the flow of direct current.

An electric question game can be made by the class. Materials needed include: a large, flat cardboard box at least three inches deep, 20 brass paper fasteners, a dry cell, a lamp socket, a small bulb, and about 20 feet of insulated wire.

In the cover of the box, punch four rows of holes, two rows near one end and two near the other end. Each row should contain five holes. These rows should be barely large enough to squeeze in the point of the paper fastener. Push a paper fastener into each hole, but do not bend it apart.

On the underside of the cover, attach to the first fastener in the first row one end of a piece of wire a foot long. Attach the other end of the same wire to any fastener in the third or fourth row. Be sure that the insulation has been removed from each end of the wire before attaching the wire. Scrape the ends of the copper wire until they are shining. Wind the ends tightly around the fasteners. Now bend the

Texts

Heath - Grade 5,
Science In Our World,
p. 302-306.

(Grade VI - Electricity and Magnetism)

(Problem 9 - continued)

Concepts

Activities

Texts

points of the two fasteners apart and fasten them back against the cover.

In the same way attach a wire between the second wire fastener in the first two rows and some other fastener in the third or fourth row. Keep on attaching wires until every wire in the first and second row is attached to a fastener in the third or fourth row.

Fasten a lamp socket to the cover. Cut a piece of wire about a foot long and remove an inch of insulation from each end.

Attach one end to a screw on the lamp socket. The other end will be your question wire. This end is not attached. Place the dry cell inside the box.

With another wire a foot long, join one screw of the lamp socket through a hole in the cover. Attach a third wire, one foot long to the empty screw of the dry cell. This is the answer wire. Make a small hole in the cover of the box. Pass the free end of the answer wire through it. Now cut four paper strips to fit against the four rows of fasteners. Lay them in place and draw lines across the strip, one line at each fastener.

Prepare ten science questions and answers. Write the first question on the top space of the first paper strip. Write the answer in the space where

(Grade VI - Electricity and Magnetism)

(Problem 9 - continued)

Concepts

Activities

Texts

the wire from the first fastener goes. In the same way, write down all the questions and answers. With scotch tape, attach the four paper strips next to the four rows of fasteners.

Now have a pupil touch then end of the question wire to a fastener in one of the question rows. Then have a pupil touch the end of the question wire to the correct answer. If he has chosen the correct answer, the lamp should light.

The lamp lights because there is a wire from the question to its correct answer. This wire completes the circuit, as you can see by tracing the current from the dry cell all the way through and back to the dry cell. Each question has a wire that completes its circuit to its answer.

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(Grade VI - Electricity and Magnetism)

(Source Materials - continued)

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(Grade VI - Health Functions)
(Problem 3 - continued)

GRADE SIX

HEALTH FUNCTIONS OF THE BODY SYSTEMS

Problem 1: How may one learn about the functions of the body and how to have good health?

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Regular visits to the doctor are important for good health. He will correct troubles and tell children what food is needed for best growth, and what exercise, rest and sleep is needed. Systems of the body and why good health is essential to keep them functioning properly should be explained. Practice good health habits.	A doctor or a nurse visit the classroom and explain the functions of systems of the body, using a chart talk. Have he or she to bring special instruments to show the class. Make a list of good health habits. Put a star beside the ones you have formed. Practice the habits and by the end of the year all should be starred.	Heath - Science For Today and Tomorrow, Grade 6, p. 138.

Problem 2: What happens when one does not receive the proper diet?

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Overweight or underweight may be caused from a poor diet. Unhappiness may be either a cause or a result of each. A poor diet will cause the body to function improperly.	A chart of the seven basic foods may be in view at all times during the unit. Each child make well-balanced menus for three meals. Appoint a committee to list good in-between-snacks. Check height and weight.	Heath - Grade 6, Science For Today and Tomorrow, p. 140

Problem 3: What other habits are essential to good health?

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
Good feelings aid good health. Learn to control anger and to be pleasant. Interests of		

(Grade VI - Health Functions)

(Problem 3 - continued)

Concepts

Activities

Texts

your own, such as hobbies,
are an aid to good feelings.
A healthy body requires plen-
ty of exercise, fresh air and
sunshine.

Problem 4: What is the body's pumping machine and how does it operate?

Concepts

Activities

Texts

The heart acts as a pumping
machine by carrying the blood
to all parts of the body.
It is made of two separate
pumps which work at the
same time. Each pump in
the heart has two parts -
an upper part called the
auricle, and a lower part
called the ventricle. The
auricles receive blood from
the body. The muscles in
the walls of the auricles
squeeze the blood into the
ventricles. The ventricles
pump the blood into the body
again.

If possible, examine a steth-
oscope. Use a ticking clock
and a rubber tube. Hold the
tube to the ear and the other
end to the clock. Place the
tube on different parts of the
body and notice how the sound
changes.

Get a heart from a butcher;
cut it open and notice the
four chambers and the muscles.

MacMillan - Grade 6,
Charters-Smiley-
Strang: Habits,
Healthful and Safe,
p. 160.
Heath - Grade 6,
Science For Today
And Tomorrow,
p. 168-169.

Problem 5: What is the circulatory system?

Concepts

Activities

Texts

The heart pumps the blood in-
to tubes called arteries.
The arteries near the heart
are large, but divide into
smaller arteries that carry
blood to all parts of the
body.

Have a chalk talk to show
flow of blood from the
heart through the body, and
back to the heart.

Ditto sheets for each child
to label the different parts.

The smaller arteries divide
into thin tubes called capil-
laries. The blood then flows
back to the heart through
tubes called veins.

Arteries carry blood away from

(Grade VI - Health Functions)

(Problem 5 - continued)

Concepts

Activities

Texts

the heart, and veins carry blood to the heart.

Problem 6: How is blood a transportation system?

Concepts

Activities

Texts

Blood carries digested food from the intestines to the rest of the body. It brings back the waste product, carbon dioxide.

Film - "Heart and Circulation."

The blood has two kinds of corpuscles - red and white. Red corpuscles take in oxygen while in the lungs, but give it up in other parts of the body. Since every living cell of the body needs a supply of oxygen, it is important to have plenty of red cells.

There are usually one or two white cells to every one thousand red cells. The white cells act as germ eaters.

Problem 7: Can the heart beats be checked?

Concepts

Activities

Texts

The pulse or each beat of the heart sends fresh blood into the arteries. A blood pressure is checked to see if it is high, low, or normal.

Feel your wrist and count the beats. To see the beats, put a thumbtack in a match stem and rest it on your wrist. With each movement of the match, you can count the beats.

Problem 8: What is the respiratory system? How do we breathe?

Concepts

Activities

Texts

As we inhale, air flows in through the nostrils and through passages of the

Heath - Grade 6,
Science For Today
And Tomorrow, p.
156.

(Grade VI - Health Functions)

(Problem 8 - continued)

Concepts

nose. The air flows through the windpipe, which branches into two tubes, each one going to one of the two lungs.

Some of the air we breathe passes through capillaries to the blood and becomes part of the red blood cells. Carbon dioxide comes out of the blood into the air pockets. We exhale this.

You breathe more deeply during heavy exercise. That is when your body needs more oxygen. The breathing muscles breathe more rapidly and take in more air.

Activities

Hold a thermometer near the face and compare temperatures of air you inhale and air you exhale.

Take a jug made of glass and a rubber tube. Fill the jug with water and place upside down in a basin half-full of water. Put the tube into the neck of the bottle. Exhale one breath. This shows the air exhaled in one breath as the water goes out.

Texts

Heath - Grade 6, Science For Today And Tomorrow, p. 156-157.

Problem 9: What is the digestive system?

Concepts

The relation of the organs of digestion - mouth, tongue, salivary glands, teeth, stomach, esophagus, small intestine, large intestine, liver, gall bladder.

Food is chewed and mixed with saliva and softened. It travels to the stomach by way of the esophagus. Stomach food is mixed with gastric juices. Food furnishes energy. The wastes enter the intestines.

Activities

Draw diagrams of the digestive system. Find a picture of an attractively-set table which would aid in digestion by making the meal seem more appetizing.

Texts

MacMillan - Grade 6, Charters-Smiley-Strang: Habits, Healthful And Safe, p. 107-115.

Problem 10: What is the locomotor system? What is the framework of the body?

Concepts

Bones support the body and protect the important organs. Each bone is hard and firm, but the connections are flexible.

Activities

Mount bones and joints of chicken, et cetera on chart. Use a shadow-graph showing

Texts

Heath - Grade 6, Science For Today And Tomorrow, p. 166-171.

(Grade VI - Health Functions)

(Problem 10 - continued)

Concepts

We have thousands of muscles all over the body that make us able to move around.

Muscles are thick in the middle and narrow on each end. The ends are called tendons. Muscles work in pairs, each pulling in opposite directions. They become firmer and stronger with exercise.

Activities

good and bad postures.

Draw pictures showing different movements of people, such as playing ball, writing a letter.

Illustrate positions of bodily movement, showing muscular co-ordination.

Texts

Problem 11: What are ways to protect our bodies from disease?

Concepts

Most diseases are caused by germs. There are different kinds of germs which cause different diseases. Scientists classify disease germs as plants, animals, and viruses. A doctor may make a culture to identify germs.

Vaccines, antitoxins and chemicals are preventives. Liquid, called vaccine, is taken in by the blood. It causes the body to make a substance to destroy germs.

Substances may be injected to work against the toxins. Antitoxins are usually obtained from animals.

Scientists have discovered that chemicals can prevent or cure diseases.

Activities

First-aid lesson to find out rules for treating minor injuries. Show a slide of bacteria under a microscope. Make charts to show the different bacteria. Conduct a panel on sanitation.

Texts

Heath - Grade 6,
Science For Today
And Tomorrow,
p. 172-177.

GRADE SIX

THE ATMOSPHERE AND OUTER SPACE

This unit should help children understand why and how space travel is of paramount interest and importance, not only to our country, but the world as a whole. They will learn, through research, experimentation and drawing conclusions, what motivates man in exploring outer space. Children can thus be awakened to the adventures awaiting the professional scientist. Finally, a unit on space travel provides an opportunity to study the relationship between the earth's atmosphere, gravitation and the solar system. It should be kept in mind that scientists hope, by viewing earth from afar, to get a better understanding of what is happening on it. From a permanent space station, men will have a take-off base for trips to the moon and other planets.

Because of the variety of related subjects, it is suggested that the topics be confined to three broad fields:

1. The atmosphere and outer space
2. Traveling in outer space
3. Living in outer space

Problem 1: What is atmosphere?

Concepts

We live in the first layer of atmosphere called the troposphere, where there are continual changes - winds, storms, vacillation in temperature and so on.

Activities

Have a report given and chart made of the atmospheric layers. Show chart to group on opaque projector. Discuss effects of extremes of weather and temperatures. Collect pictures and articles on weather phenomenon.

Texts

Heath - Grade 4,
Science In Your Life, p. 167-168, 143, 176.
Heath - Grade 5,
Keeping Healthy and Strong, p. 31-33, 16, 194.
Heath - Grade 6,
Science For Today And Tomorrow, p. 285-324.
Ginn - Grade 5,
Keeping Healthy and Strong, p. 48, 53, 60, 63, 68, 69, 85, 86.
Ginn - Grade 6,
Experimenting In Science, p. 24, 134, 209, 252, 253-255.

(Grade VI - Atmosphere and Outer Space)

(Problem 1 - continued)

Concepts

Activities

Texts

A second layer called the stratosphere reached a height of 140 miles above earth. The ozone layer turns back the ultra-violet rays and protects us from burn-sound travels. Use graphing. It also turns back sound waves to earth.

Bring in different types of heat bulbs (infra-red, sun-lamp, ultra-violet). Report on wave lengths of ultra-violet rays. Report on how sound travels. Use graph showing temperature of different layers.

Heath - Grade 5, Science In Our World, p. 31-32.

Heath - Grade 6, Science For Today And Tomorrow, p. 259-263, 271-273, 130-135, 279-287.

Ginn - Grade 6, Experimenting In Science, p. 67, 69, 71-72, 75-77, 262.

The third layer, the ionosphere, reflects and bounces back radio signals. Without it, there would be no long-range radio.

Discuss radio and television reception and transmission.

Heath - Grade 5, Science In Our World, p. 32, 277, 284.

Ginn - Grade 5, Keeping Healthy And Strong, p. 131-143, 134-135, 243.

Ginn - Grade 6, Experimenting In Science, p. 59, 62, 73, 212, 219.

The atmosphere extends to about 400 miles beyond the earth, and the exosphere is the region beyond the atmosphere.

Discuss characteristics of exosphere (color and so on). Make a report on moon, comparing to earth. Report and chart of our solar system in relation to a city street. Use game to learn planets, such as "Which am I," using characteristics of different planets.

Heath - Grade 4, Science In Your Life, p. 270-274.

Heath - Grade 6, Science For Today And Tomorrow, p. 259-281.

Ginn - Grade 5, Keeping Healthy And Strong, p. 124-126, 130, 140-143.

Ginn - Grade 6, Experimenting In Science, p. 78, 79, 80, 81.

The farther from earth one travels, the thinner the oxygen.

Special report on moon and tides. Do experiment with several holes in tin can full of water, noting that

Heath - Grade 4, Science In Your Life, p. 294.

(Grade VI - Atmosphere and Outer Space)

(Problem 1 - continued)

Concepts

Activities

Texts

The atmosphere keeps the earth from getting too hot and holds heat to the earth, keeping it from getting too cold.

at the bottom water spurts out farther. Draw conclusion that water is "heavier" at bottom. Liken water to air with earth at bottom of "air sea."

Discuss insulation principle in house construction and in the wearing of clothes. Do experiment of wetting finger and placing on hot surface. Coating of steam protects finger from burning as atmosphere protects earth.

Our solar system is a very small part of a galaxy called the Milky Way. There are other and larger galaxies in the universe.

Draw a large mural of general shape of Milky Way by spattering great masses and groups of stars on dark background. Our solar system's place in the galaxy, can be marked. Report on spectrum and spectrum analysis. Take trip to Akron University to see spectrograph. This should be limited to gifted children.

Heath - Grade 5, Science In Our World, p. 31-32.

Heath - Grade 6, Science For Today And Tomorrow, p. 101, 103, 107, 111.

Ginn - Grade 5, Keeping Healthy And Strong, p. 250-253.

Ginn - Grade 6, Experimenting In Science, p. 28, 113, 119, 123.

Heath - Grade 4, Science In Your Life, p. 13, 21, 170-171, 167.

Heath - Grade 5, Science In Our World, p. 16, 294.

Heath - Grade 6, Science For Today And Tomorrow, p. 285-317.

Ginn - Grade 5, Keeping Healthy And Strong, p. 24, 134, 209, 252-253.

Ginn - Grade 6, Science For Today And Tomorrow, p. 69, 69, 85, 86.

Heath - Grade 4, Science In Your Life, p. 287, 302, 272-280.

Heath - Grade 6, Science For Today And Tomorrow, p. 259-281, 134-135, 274, 280-281, 282, 256-257, 132-135.

Ginn - Grade 5, Keeping Healthy And Strong, p. 102, 107, 113, 115, 108-117, 98-102.

(Grade VI - Atmosphere and Outer Space)

(Problem 1 - continued)

Concepts

Activities

Texts

To escape the earth's gravity, rockets would have to reach a speed of nearly 25,000 miles per hour.

A report should be made of Sir Issac Newton's Law of Gravitation. A short biographical sketch may be included. A report and discussion of why the velocity needed for escape from the gravitational pull must be close to 25,000 M.P.H. and yet not over this to avoid burning up from the air's friction. Develop some mathematical concepts based on facts from research. For example: If a rocket traveled toward the moon at the rate of 25,000 M.P.H., how many days will it take to get there?

Ginn - Grade 6,
Experimenting In Science, p. 74 -83,
89-90, 93-95.

Heath - Grade 4,
Science In Your Life, p. 275-281.

Heath - Grade 5,
Science In Our World, p. 30-32.

Heath - Grade 6,
Science For Today And Tomorrow,
p. 216, 276, 281,
282.

Ginn - Grade 5,
Science In Our World, p. 5, 22,
24-25, 243-244,
245, 248, 260.

Ginn - Grade 6,
Experimenting In Science, p. 93, 94.

Problem 2: What does one need to understand in order to travel in outer space?

Concepts

Activities

Texts

The man-made satellite is a magnesium globe containing radio and recording instruments to report on the sun's heat, the earth's magnetism at that height, cosmic rays, et cetera. The information will be sent to earth by a tiny automatic radio transmitter, known as telemetering. Sent into space by a three-stage rocket, the satellite will travel in an elliptical orbit around the earth.

Clippings of both Russian and American satellites can be collected. From reference books, pictures can be drawn of satellites. Plastic models showing how the satellite is carried can be procured. Models of three-stage rockets can be made during Art Period. Swinging a bucket of water over head (best done out of doors can illustrate the force of equilibrium. Emphasize force of gravity pulling satellite in one

Heath - Grade 5,
Science In Our World, p. 30-31,
32, 16, 194.

Heath - Grade 6,
Science For Today And Tomorrow, p. 271-
274.

Ginn - Grade 5,
Keeping Healthy And Strong, p. 102, 122-
130, 132-133.

(Grade VI - Atmosphere and Outer Space)

(Problem 2 - continued)

<u>Concepts</u>	<u>Activities</u>	<u>Texts</u>
	direction, plus force of gravity pulling in opposite direction balance each other. This can be illustrated by using two different colors of thread representing the two forces attached to a spool and held between the hands. A good individual activity would be a time line plotting the history of rocket development.	Ginn - Grade 6, <u>Experimenting In Science</u> , p. 166-171, 80.
A space ship will travel from one ground point to another. It will resemble a double jet with double wings and pilots. The first stage serves to get the second stage into space at a speed of about 3,600 miles per hour. As the second stage moves under its own power, the first stage will land, nearly out of fuel, at a speed much slower (about one-half) than now used by passenger planes.	Using a world map, have pupils chart some possible long-distance space flights. As a special topic, why would flights between Los Angeles and New York or Boston be more practical than flights over cities separated by water. A collection of news clippings of satellite launchings during the International Geophysical Year would be a "good-class project." From a panel discussion comparing flights of propeller-driven planes, jets and rockets, will come facts which make it clear why rockets are the only type practical for space flight. Make a simple model of internal-combustion engine using coffee can with candle inside. With air hose attached to funnel, also inside, blow puffs of corn starch, causing combustion. Make model of jet turbine, using coffee can with tubing from lid, utilizing steam pressure to blow pin wheel.	Heath - Grade 4, <u>Science In Your Life</u> , p. 284-300. Ginn - Grade 5, <u>Keeping Healthy And Strong</u> , p. 5, 22, 24, 243-244, 245, 248, 260.

(Problem 2 - continued)

Concepts

Space travel between the moon, Mars, Venus, and other planets will not be possible until man can construct space stations. The flight to the moon will be about a ten-day round trip. A one-way flight to Venus will take 146 days; to Mars, 250 days.

Machines flying to outer space must carry enough oxygen for all of the crew, as well as fuel.

Activities

Read and talk about space medicine, showing what type of cabin must be constructed to protect crew. Let a child with an interest in figures make a graph showing relative speeds of a walking man, a trotting horse, an automobile, a propeller-driven plane, a jet and a rocket to emphasize the tremendous speed science has achieved. Write stories in the first person, reporting on the first trip to the moon, Mars, et cetera. After some research has been done, have a list compiled of some of the problems that must be solved before inter-planetary travel will be practical.

A report on why two and three stage rockets are needed for travel beyond the atmosphere. All the children will be excited by a list of dangers connected with space travel. A project for a gifted child would be to report on the instrument panel of a rocket ship. His science background plus his imagination will be all that's needed.

Texts

Heath - Grade 4, Science In Your Life, p. 231-232, 284, 287.

Heath - Grade 5, Science In Our World, p. 14, 18, 19, 21.

Heath - Grade 6, Science For Today and Tomorrow, p. 255, 261, 281, 254, 274, 276, 335.

Ginn - Grade 5, Keeping Healthy And Strong, p. 31, 40, 42, 43, 202, 204.

Heath - Grade 4, Science In Your Life, p. 293-299.

Heath - Grade 5, Science In Our World, p. 30-33.

Heath - Grade 6, Science For Today and Tomorrow, p. 329, 337, 342, 349, 346-352.

Ginn - Grade 5, Keeping Healthy and Strong, p. 8, 13-14, 15-16, 19-21, 22, 25-27, 242, 250-254.

(Grade VI - Atmosphere and Outer Space)

(Problem 2 - continued)

Concepts

From far off in space, the earth might appear as in the picture on pages 132-133, Experimenting In Science.

Activities

Pictures of earth as pictured from the moon would make interesting projects. Cartoons of "creatures" from other planets observing the earth will be very popular. The appearance of the earth may be discussed. Will it look like a shining star?

Texts

Heath - Grade 6, Science For Today And Tomorrow, p. 259-263, 279-281.

Ginn - Grade 5, Keeping Healthy And Strong, p. 99-112.

Problem 3 - Will it be possible to live in outer space?

Concepts

Among the problems connected with man's trying to live in outer space are lack of gravity and oxygen, and problems of extremes of heat and cold.

Activities

Comparison pictures of how man will need to be dressed when visiting various planets. List possible problems arising from absence of gravity and possible solutions. Ask class to list all of the things they do in fifteen minutes which can be done easily or only because there is gravity.

Texts

Heath - Grade 5, Science In Our World, p. 30-31, 32, 16, 194.

Heath - Grade 6, Science For Today And Tomorrow, p. 271-274.

Ginn - Grade 5, Keeping Healthy And Strong, p. 5-102, 122-130, 132-133.

Ginn - Grade 6, Experimenting In Science, p. 166-171, 80.

The practicality of building a space station is based on the premise that once an object gets into orbit beyond the atmosphere, it will remain there until some force moves it out.

A committee can plot the possible orbit of a space station around the earth (the orbit of the moon). An imaginative group can discuss materials, shape and assembly programs. Encourage research to find out why proposed space stations will be wheel-shaped. Design and construct miniature space station.

Heath - Grade 4, Science In Your Life, p. 284-300.

Ginn - Grade 5, Keeping Healthy And Strong, p. 5, 22, 24, 25, 243-244, 245, 248, 260.

(Grade VI - Atmosphere and Outer Space)

(Problem 3 - continued)

Concepts

Pilots transporting parts for building the space station must manage their flight patterns and schedules so every flight will always arrive at the same spot.

People living in space stations will have to wear special clothing.

Eating and drinking will be very difficult for man who was made to live with earth gravity.

Activities

Experiment trying to throw an object at a moving target while moving yourself. Discuss the problems of space navigation. Emphasize that the satellites, the earth and the solar system will all be moving. Discuss the problems of landing and taking off. Let a committee make a schedule of a typical day in the lives of a 36-man crew who would live in a space ship for about four weeks at a time.

Have a team of children design a suit with these properties: ability to keep the wearer warm and to supply oxygen; flexible enough for the wearer to move and work freely and easily; et cetera. Using proper connections, a model of a proposed space suit can be obtained from the G.A.C.

List all body functions which depend largely on gravity (circulatory, elimination, et cetera). List possible solutions, after research, on how man will be able to drink and eat. Assign one pupil to look up material.

Texts

Heath - Grade 4, Science In Your Life, p. 284, 231-232, 287.

Heath - Grade 5, Science In Our World, p. 14, 21, 18, 19.

Heath - Grade 6, Science For Today And Tomorrow, p. 255, 261, 281, 254, 274, 276, 335.

Ginn - Grade 5, Keeping Healthy And Strong, p. 31, 40, 42, 43, 202, 204.

Heath - Grade 4, Science In Your Life, p. 287-300.

Heath - Grade 5, Science In Our World, p. 16, 194.

Heath - Grade 6, Science For Today And Tomorrow, p. 154-155.

Ginn - Grade 5, Keeping Healthy And Strong, p. 132-133, 80-83, 92, 93.

Heath - Grade 4, Science In Your Life, p. 289-290, 275-284.

Ginn - Grade 5, Keeping Healthy And Strong, p. 27, 336, 146-147.

(Grade VI - Atmosphere and Outer Space)

(Problem 3 - continued)

Concepts

Activities

Texts

on experiments in suspended animation. This would be best given to a gifted child.

Ginn - Grade 6,
Experimenting In Science, p. 81,
82, 171, 250,
266, 274, 272,
275, 214, 232.

Without gravity, moving huge objects will be no problem because they will be weightless.

Make a chart showing the relative weights of objects on different planets. Discuss the advantages and disadvantages (construction, et cetera). Have a group plan a skit of two earth boys meeting two space boys.

A permanent space station has some practical purposes. Weather can be forecast for the world for many days at a time. Shipping can be warned of icebergs, fogs and hurricanes. A closer look at the other planets will be possible. The space station telescopes, though smaller than those on earth, will achieve great distances because of the absence of atmosphere.

Discuss why stars twinkle. A report on astronomy as a subject will reveal many of the problems encountered in observing the skies.

CULMINATION

Feature a "Space Day: on which you can invite parents or other classes to visit. Display drawings, photos, charts and diagrams that were made. Add a touch of humor by having your hosts greet the guests wearing space helmets.

Short oral reports can orient visitors as to what has happened. A feature could be a debate - Resolved, that the moon could be made inhabitable for those from overpopulated areas of the earth. A corner of the room can be decorated to resemble a travel office where reservations can be made for trips to space stations "Utopia" and "Paradise," as well as to the moon, Venus or Mars.

A local personality who is active in the field of rockets and missiles might be invited to speak to the group.

Certainly, this unit needs little help to "Blast Off."

(Grade VI - Atmosphere and Outer Space)

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(Grade VI - Atmosphere and Outer Space)

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LISTS OF EQUIPMENT NEEDED
FOR THE EXPERIMENTS IN THE SIX BOOKS OF
THE HEATH ELEMENTARY SCIENCE

Book I - SCIENCE FOR WORK AND PLAY

The simple equipment needed for the experiments in this book can be gathered from the school and the homes of the children. Following is a list of equipment for the units in which the children do some experiments.

Away We Go

toy wagon
dolls
board
blocks

Wheels Help

box
blocks
small wagon

Weather

3 bowls
rubber rain hat
leather shoe
cotton shirt
cardboard
lighted bulb
wax paper
balloon, fan
basin of water

Fire

pumpkin
candle
drinking glass
knife

The Safe Way

blocks
chairs
board
water

Work and Play With Water

basin
objects which float or sink
jars of paint
2 glass jars with covers
cloth
2 pans
electric plate

Ways To Find Out

toy musical instruments
different foods for tasting
different things to smell

Seeds and Plants

lima beans, seeds
glass containers
sprinkler

(Equipment Needed for Experiments)

Animals In School

earthworms
glass jar
black paper
soil, sand, cornmeal

Air Is Real

paper napkin
drinking glass
aquarium
soda straw
empty bottle
strips of paper

Book II - SCIENCE FOR HERE AND NOW

As in Book I, the equipment for the experiments in this book is very simple. Everything needed can be gathered from the school and the homes of the children. Following is the list of equipment needed for the experiments in this book.

Your Day

globe
flashlight

Doing Work

books, pencils, string
small wagon
box, boards

Fall Brings Changes

2 growing plants
2 boxes of wet soil
seeds

The New Building

plaster of Paris
molds

Why We Use Stone

stone, iron nail
bowl, soil
candle, block
pliers, basin

Why We Use Wood and Iron

2 iron nails
paint, paper
hammer, saw
wood

Why We Use Glass

box
paper

Winter Coats

2 glass jars
woolen sweater

We Store Food

foods
saucers

A Thermometer

thermometers
bowl
ice cubes, warm water

Weather

electric plate
tea kettle
small pan
piece of glass

Magnets

magnets
pieces of wood, glass,
iron, et cetera
paper clips, tack, hairpins
needles, nails
wood, basin

(Equipment Needed for Experiments)

Plants For The New Building

2 boxes, 2 jars
good garden soil
sandy, light-colored soil
grass seed, beans
2 plants of same kind

Ready For Dinner

2 wash cloths
2 bowls
soap

Book III - SCIENCE FAR AND NEAR

Although the experiments in Book III are more detailed than they are in Books I and II, the equipment needed to carry them out is still simple. Very little of it must be purchased. Most of it can be gathered from the school and the homes of the children. Following is a list of equipment needed for the experiments in the units in this book.

The Earth's Cover

4 glass jars with screw tops
Empty ice tray
2 bottles with covers
paper bag, sand paper
4 different soils

Rocks and Clay

several kinds of rocks
clay, straw
milk carton
pieces of broken dishes and
clay pots

Science and Clothing

pieces of different fabrics
2 stalks fresh celery
red ink
stems and stalks of plants
cotton, milk, vinegar
eye dropper

Let's Find Out About Limestone

limewater
soda straw

Keeping Food

2 slices bread
magnifying glass
2 bean plants

Plants and Animals of the Desert

sand, soil
flower pot
strips of paper

Water for Farms and Homes

2 plants - same kind and size
shallow pan
wax paper
rubber tube, funnel

The Ocean

2 glass jars
washed sand, pebbles
salt
tea kettle
plate, cup

Plants and Animals of the Sea

no equipment needed

Lake and Stream

drinking glass
2 large sheets cardboard
paper: white, dark

(Equipment Needed for Experiments)

Keeping Food (continued)

salt

Forest Plants

metal foil, pan
2 tree twigs, red ink
pieces of different woods
2 growing plants

Stars and Moon

ball, electric light
small flashlight

Electricity Works For Us

wire: thin piece, thick piece
dry cell
2 feet covered wire
iron nail, iron tack
small lamp socket
3 pieces covered wire
flashlight bulb
key

Lake and Stream (continued)

aquarium
water plants and animals
sand, pebbles
newspaper, oil

Keeping Warm In Winter

gloves: one cloth, one leather
thin cotton cloth
2 glass jars with covers
piece of fur or wool
drinking glass
short wooden pencil
nail as long as pencil
cup hot water
tea kettle, glass bottle
blackboard erasers

Machines

long board, block of wood
long stick
egg beater
bicycle, roller skate
string, books

Book IV - SCIENCE IN YOUR LIFE

Following is a list of equipment needed for the experiments in Book IV. Very little of this equipment needs to be purchased. Most of it can be gathered from the school and the children's homes.

Weather

2 saucers
black paper
2 thermometers
soil
2 bowls

electric plate
small pan
balloon
baby's bottle

2 blackboard erasers
large electric bulb
window pole, paper
2 glass jars with tops
ice cubes, water

(Equipment Needed for Experiments)

Moving Things On Land

square block wood	round block wood	old wagon
rough board	sand	15 or 20 marbles
books, string	cardboard	heavy book
fine sand paper	pencil	coffee can lid with rim
rough stone	2 pieces toast	jar with screw top
mirror, cotton	butter, oil	soap, water

Moving In Water

toy boat with a propellor	milk carton
ink	balloon

Riding On Air

pair roller skates	strip of paper 6" X 2"
2 large sheets heavy cardboard	dry sand

You Use Air

glass of water	strip of paper
small card	balloon

Plants and More Plants

small clump of grass
sweet potato
onion

Plants and Seeds

6 lima beans	cardboard box
3 small containers	large enough to
sand	cover containers and
	1 foot high

Insects That Work Together

No equipment needed

Climate

black paper	white paper
2 thermometers	strong electric bulb
ball	cellophane

(Equipment Needed for Experiments)

Water, The Stream of Life

orange juice	2 saucers	soil in pot
glass, dish	mirror	microscope
dried fruits	potted plant	onion
small piece fresh meat	aluminum foil	paper towel
	2 large glass jars	sugar, water

High Water - Low Water

acquarium	spoon	basin
sand, soil	empty tin can	
sprinkler	2 foot rubber hose	

Pure Drinking Water

milk carton	drinking glass	microscope
clean sand	stagnant water	
clean gravel	bleaching water	

Seasons

A globe
flashlight

We Use Power

milk carton	spool, needle	3 feet bell wire
toothpicks	snap fastener	metal foil, matches
thread, button	paper clips	magnifying glass
oatmeal boxtop	large nail	medicine bottle with
pencil with eraser	dry cell	plain stopper

Book V - SCIENCE IN OUR WORLD

This is a list of the equipment needed to carry out the experiments in Book V. Very little of this equipment must be purchased. Most of it can be gathered from the school and the children's homes.

Travelers Around the Sun

No equipment needed.

Neighbors In Space

No equipment needed.

Explorers

globe	small empty bottle	needles, spool
paper boat	ink, ice water	pencil, snap fastener

(Equipment Needed for Experiments)

Explorers (continued)

card, pencil	hot water	magnet, paper
box, ball	piece thick twine	large bottle
wooden block	2 short pieces wood	one-hole rubber stopper
round plate	2 thin nails	glass tube 8" long
large glass jar	protractor	bent in shape long L

Exploring The World of Molecules

salt, ink	moth balls	copper sulfate
drinking glass	2 bottles	key, steel wool
medicine dropper	dry cell	2 tin cans
shoe box	2 pieces copper wire	wax paper
large onion, knife	wire about 12" long	2 small squares of glass

Exploring Solids, Liquids, and Gases

paraffin	wire	basin hot water
small pan	knife, candle	balloon, silver spoon
pencil, twine	bottle, ink	metal rod, wax
balloon	one-hole stopper	aluminum cup
cleaning fluid	glass tube	plastic cup

Exploring The World of Living Things

newspaper	other foods	beans
oil, iodine	for testing for	glass dish
laundry starch	starch	

Exploring The Farmer's World

samples of soil
glass jar
blue and red litmus paper

Water and Conservation

2 boards or cardboard	twigs with leaves	milk carton
1 foot square	grass or birdseed	4 paper clips
soil, sprinkler	Turkish towel	glass jar
		soil, pebbles

Exploring Inside The Earth

Half-empty tube,	small nail	rock particles
toothpaste	string, pencil	three-cornered file
tall glass	milk carton or	clear vinegar
sugar	shoe box	bits of seashell

(Equipment Needed for Experiments)

Mineral Treasure

heat-proof test tube	peanut, candle	medicine dropper
one-hole rubber stopper	orange or lemon peel	powdered clay
test tube holder	shelled nuts	small metal things
leaves and twigs	oil, sand	quart jar
alcohol lamp	pebbles	can, board
	pieces unglazed	2 blocks, salt
	flower pot	dark fuzzy cloth

Machines

roller skate	bucket, sand	cardboard
small board	movable pulley	marble
pencil, eraser	2 milk cartons	spool
book, paper clip	3/4" bit	folded card
thin rubber band		

Exploring Your Growth

peeled potato	iodine
4 glasses	medicine dropper
cup of water	coarse grater
tablespoon	cube of sugar
	thermometer

How We Get Electricity

No equipment needed.

How We Use and Control Electricity

bulb socket	copper wire	large, flat cardboard
2 pieces wire, each 1 foot long	2 pieces insulated wire	box
dry cell	Christmas tinsel	20 feet insulated wire
board	lamp cord	20 brass paper fasteners
2 tacks		

What Will The Weather Be?

2 coat hangers	rubber stopper	broom straw
2 medicine droppers	with hole	Scotch tape
2 milk cartons	glass tube, 6 inches	4 thumb tacks
staples	longer than bottle	nail polish
2 strips thin wood	ink, nickle	long hair
4 pointed paper cups	needle, paper clip	large jar
large bottle		olive bottle
		card, ruler

(Equipment Needed for Experiments)

Book VI - SCIENCE FOR TODAY AND TOMORROW

This is a list of equipment needed to carry out the experiments in Book 6. Most of this equipment can be gathered from the school and the pupil's home. Very little of it must be purchased.

The News Comes To Us

piece of thread	wax paper	hairpin
key	mirror	thin slice of pear
wide rubber band	glass prism	and of apple
2 magnifying glasses	toothpick	salt, sugar
soda straw	colored cellophane	chocolate
flashlight	or colored glass	vinegar
white paper	colored paper	water-color brush
8 glass tumblers	string	8 bottles
child's own musical instrument		golf ball

News Across Time and Space

2 nails	2 tin cans or	wax paper
3 pieces of wood	milk cartons	metal foil
12 carpet tacks	toothpick	Scotch tape
20 feet insulated wire	compass	2 sheets cardboard
1 dry cell	plate	small magnifying glass
metal from tin can	candle	dark blue construction paper
	potato	phonograph
		old record

The World of Chemistry

cooked egg yolk	tarnished silverware	small strips of different fabrics
shiny silver spoon	aluminum pan	drinking glass
steel wool	baking soda	paper clips
pliers	salt	news print
tin can with tight-fitting lid	ammonia or lime water	red, blue, green ink
wooden chips	litmus paper:	liquid laundry starch
gas or electric burner	blue and red	alcohol flame
	samples of soil	small pan
	red-cabbage leaves	shiny dime
	glass or enamel bowl	
	boiling water	
	various foods for starch test	

(Equipment Needed for Experiments)

A Visit To The Doctor

watch
rubber tube
thumbtack
paper match
soda straw

glass gallon jug
2 empty milk cartons
sand, water
long nail
shelled Brazil nut

metal dish
clay
metal bottle top
dish
butter
4 inches of pipe
boiled potato

Sunlight, The Food Maker

foods: beans, pea-
nuts, cheese,
cornflakes, etc.
metal dish

small flower pot
garden soil
small medicine bottle
4 washed grapes

The Changing Earth

small box
clay
brick
small dead insect
varnish, shellac, or
nail polish

plaster of Paris
vaseline or oil
small bowl
empty milk carton
seashells or
plastic animals
chicken bones

The Universe

sheet of cardboard
spook, pencil, pin
alarm clock
electric light
2 rubber balls
2 magnifying glasses

magnifying mirror
camera
roll of film
thermometer with
colored liquid
iron nail

pliers
gas or alcohol
burner
12 feet of string
ruler, soda straw
stiff paper, 4 feet
by 1 foot

The World of Weather

2 wet cloths
1 yard stick
2 jars
ice, hot water
kettle boiling water

saucepan
shiny tin can
thermometer
tepid water
cotton

rubbing alcohol or
cleaning fluid

(Equipment Needed for Experiments)

Power Today and Tomorrow

matches	concave mirror
glass medicine bottle	box lined with black paper
with stopper	sheet of glass to cover box
magnifying glass	luminous paint
2 bar magnets	
2 thermometers with	
colored liquid	